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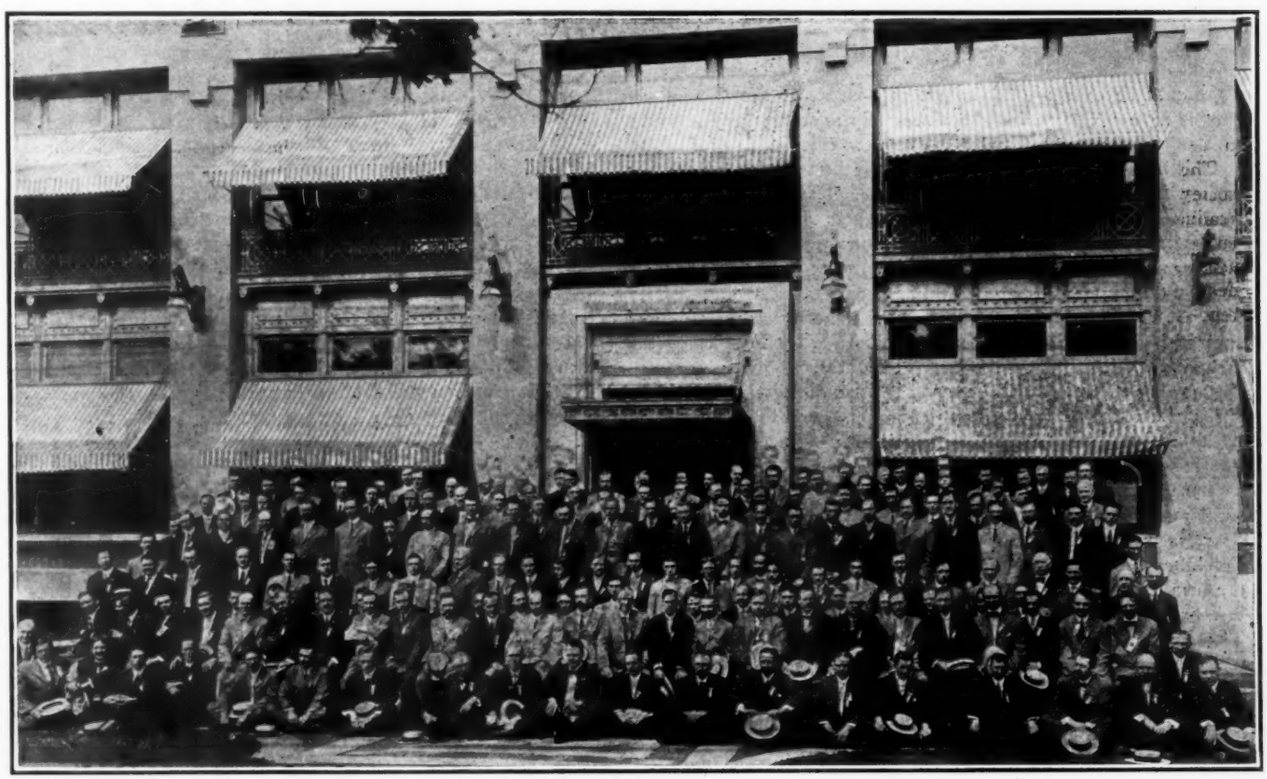
THE AUTOMOBILE

Standardization Is S.A.E. Slogan

Shipboard Convention of the Organization Most Successful in Its History—Four Hundred in Attendance—President Donaldson Outlines the Future Work—Several Valuable Papers Read and Discussed



S. A. E. delegates assembled in front of the Ford office building, Detroit, previous to an inspection of the plant

DETROIT, MICH., June 29—The regular midsummer meeting of the Society of Automobile Engineers ended one of the most useful sessions in its career when the steamboat City of Detroit landed at the dock at 9 o'clock this evening, after a two-day cruise to Mackinac Island and return, during which time the regular sessions of the society were held on ship. Never before in the history of automobile associations in America has there been such a unique meeting, namely, discussing automobile topics on board a ship on the high seas. Happily the one-half day's experience two years ago on shipboard with its cooling breeze and quietness suggested the possibilities of an entire convention on water rather than land, and when the hustling Detroit entertainment committee was assured of the meeting being held in the city, it did not take long to suggest the chartering of a ship for the society and their wives, sisters and daughters.

On Thursday morning, when the convention was called to order by President Donaldson in Convention Hall in Hotel Pontchartrain, it was found that a record breaking attendance was to be on hand and that with the ladies the number attend-

Convention hall in the Hotel Pontchartrain, Detroit, where the open meeting of the society was held

ing would be over the 400 mark. Undoubtedly the thought of combining a holiday with a business trip appealed very strongly to many in the society, and hosts of new faces were present.

The three-day session was one of the best in the life of the society from the viewpoint of work done. The work consisted of reading and discussing professional papers presented by members of the society; presenting of various reports by the standards committees, and acting on them; the reading of the president's address, and general routine business, including society reports on membership, finance, etc. The treasurer's report showed a balance of over $3,000 in the treasury in spite of the many heavy expenses of the last six months.

President Donaldson in his presidential address outlined the varied activities of the society during his period of tenureship, beginning with last January. He drew attention to the growth in membership, 209 members having been enrolled since the first of the year, this representing an increase of 60 per cent. over a similar period a year ago. He drew attention to the new headquarters in the Rubber building on Broadway, New York, near Columbus Circle, where open reading rooms are provided for the use of the members when in the metropolis. Since his installation in office the society has begun the publication of *The Bulletin*, a monthly organ, in which the official announcements are printed, as well as professional papers read before the society or its sub-sections in Detroit, Indianapolis, New York, etc. A feature of *The Bulletin* is the employment bureau, in which appear notices of vacant positions as well as notices of those in search of positions. The issuance of handbook data sheets continues from time to time as conditions demand. The society has secured the co-operation of the Automobile Club of America, which has placed its laboratory at the disposal of the society, and from which much valuable data is expected to come. The society during the past six months has been working hand in hand with the National Association of Automobile Manufacturers in the matter of standardizing truck features. The two complement each other, the National Association limiting its activities to merchandising the truck, covering warranties, loads and speeds, whereas the S. A. E. is working along technical lines with the hope of standardizing wheel sizes, tire sizes, and investigating generally the truck field. President Donaldson closed by drawing attention to the collection of historical data by the society and also touching at length on the work of the standardization committee of the society, which is thoroughly reviewed in this issue.

Undoubtedly the biggest factor in the convention was the lucid and emphatic exposition of the works of the standards committee of 100 and the various sub-committees. During the past six months there have been many caustic criticisms circulated on the work of the various standards committees, some engineers imagining that the society was going too far in the work and that some of the new standards set up were going to prove an injury to the industry. Chairman Henry Souther read an exhaustive paper on the subject, in which he clearly defined what is meant by standards, showed exactly what each sub-committee has been doing and pointed out tersely that the standardizing work is not the ideas of a few men, but of the entire industry. There are not any star-chamber proceedings in the matter; it is general discussion with the collection of data from all manufacturers. This matter is treated in detail in the opening pages of this issue.

Montagu on Standardization

AT the morning session, Lord Montagu, a British pioneer in motoring, who has been traveling in this country for several weeks, was present and addressed the society on the matter of standardization. He said in part:

"I esteem it a great honor to say a few words as I represent to a certain extent English automobilism. I listened to your president's address with great interest, as I saw in it reasonable standardization the same as is being aimed at today in England. But as in England, so here, you will have some difficulty if you try to raise standardization too high. There are several difficulties that will arise if you try to go too far in this work. In the first place your trade is very international, as can be seen on the main roads of England and France, where you see American-built cars in great numbers, and in considering standardization and replacement of parts you must take into consideration the standardization of the industry as it is carried on in England and France.

"Second: When people talk standardization they forget that all

invention must come as a spur of dissatisfaction. Some engineer has become dissatisfied with some part of the car and sets about to correct it; and in this great automobile movement it would be a disastrous error to place a limit on inventive genius, or, in a word, to say how the coat should be cut or how the hair should be trimmed, as it is only in certain directions that standardization must be carried on.

"Standardization has many advantages to the car maker, and the car buyer; but do not press it too far if you want to continue healthy rivalry and research work. Standardization pressed too far is bad.

"In England and France we are all endeavoring to standardize where possible. To be specific, we might have two, three or four sizes of wheels, but standardization work would simplify the work of wheel and tire makers. You can standardize on nuts, bolts, rivets, tubes, steering wheels, but if you go into carbureters and gearsets, both are today in their infancy, and you would make a mistake if you limited the activities of the engineers in any way in relation to these parts.

"Frequently outsiders see more than engineers in a problem of this nature; taking a survey of this great world-wide revolution of transportation—the automobile—you are talking on something that cannot come for a number of years.

"Take a parallel in locomotive engineering: Not until the last few years in England and France did they have any standardization, while here I see a difference, as a locomotive for hauling freight from Buffalo to Cleveland must be entirely different from one needed to haul from Kansas City to California over the mountains. The different loads and road conditions call for differences in locomotives.

"On behalf of the English engineers, we desire to co-operate in this great work, and we are glad to welcome you and your cars in our country, as it spurs our makers to higher efforts and we appreciate your cars on our shores."

List of the Papers Presented

NEW records were established at the different sessions by the discussion that followed the reading of professional papers and the presenting of reports. A year ago it was difficult to get members into discussion at former meetings, but during the present one the discussion was so great that the program was not half completed, and the reading of many papers was postponed to the midwinter meeting, which will be held in New York in January. The papers presented were:

"Motor Sizes and Drive Ratios for Commercial Vehicles," by Eugene P. Batzell; "A Comprehensive Motor Test," by Herbert Chase; "Standardization and Co-operation in Motor Testing," by Herbert L. Connell, and "Worm Gears," by Frank Burgess.

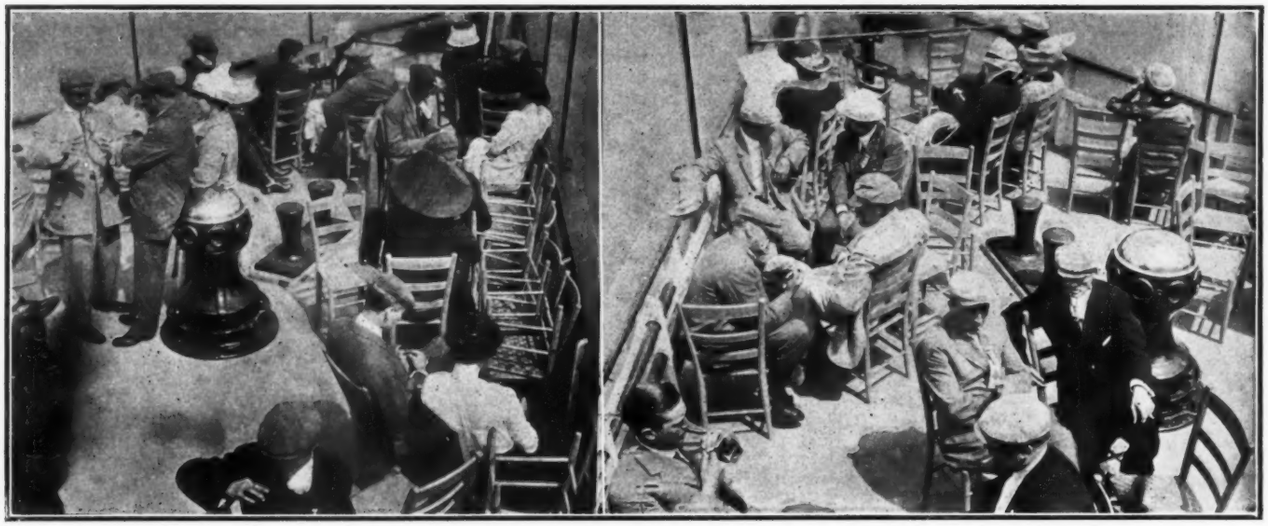
Among the papers that were laid over until the midwinter session were: "The Effect of Relation of Bore and Stroke in Automobile Engines," by John Wilkinson; "Stability of Automobile Propeller Shafts," by J. M. Thomas; "Methods of Brake Capacity Determination," by S. I. Fekte, and "Leaf Springs," by L. J. Lane. Some of these articles will be considered next week.

The presentation of reports of the various standard committees is always an important factor in regular sessions, but time did not permit to have all of the reports presented, several of these having to go over to January. Of paramount importance in the standard report field was the accepting by the society of the fourth report on carbureter fittings. This report has had a stormy career. It pertains to standardizing the size of flanges on carbureters for attachment to intake manifolds, so that the same intake manifold can be used for different makes of carbureters. At present it is generally necessary to make a new manifold when a carbureter is changed. The report also covers the matter of uniformity in connection for the gasoline pipe to the carbureter, and also the water connections with the carbureter jackets. After brief discussion the report was adopted.

The report on broaches was read by C. W. Spicer, and discussion postponed to a later session, but lack of time prevented a return to the matter, which will come up again at the midwinter session.

W. P. Kennedy, chairman of the committee on truck standards and also on wheel dimensions and fastenings for tire division, offered an oral report, stating that his committees had not any new recommendations to make, as there are minor details to settle in the present matter of standardized wheel sizes. The committee is making haste slowly, being sure of its ground in truck work before advancing. The committee wrote to wheel makers for trucks, asking them if they considered the work the

The good ship City of Detroit II which carried the engineers safely over the unsalted seas



The bow was a favorite gathering place for the engineers and the ladies. On the left Albert Champion is seen talking with his hands

committee was aiming to standardize as practical; if it required modifications; if it had been an advantage to them, and if it had caused any complications in their work. The correspondence asked if the new standards were resulting in a saving of time and money, and also what percentage of their product was being manufactured according to S. A. E. standards. The replies showed that 90 per cent. of the makers are working to the S. A. E. standards and all new work is being laid out according to such.

In reporting on the truck-standard division, Chairman Kennedy said that the committee was collecting data on truck specifications from all sources. The class papers had published many data sheets on trucks at show time, but there is need for much more. It is necessary to have complete and accurate information before certain steps can be taken toward standardization of parts, as has been accomplished in the touring car field. Several makers have objected to furnishing all of the data on the ground that they imagined their details of construction would be given country-wide circulation and so get into the hands of their competitors. The chairman assured them that any data obtained would be treated with the utmost confidence by the committee, much the same as stock-car specifications have been handled by the technical committee of the American Automobile Association.

E. T. Birdsall, in the absence of Chairman Cecil P. Poole, of the data-sheet division, told of the activities of the committee in collection of data for the society, and the tabulation and filing of it. He mentioned the work of co-operating with the United States Standard Bureau by the Detroit section and the benefits that would accrue therefrom. J. C. Heinze spoke on the advisability of establishing a society testing laboratory in Detroit, for the general use of the members. He suggested Detroit in preference to New York because of the large number of motor companies in the city, and also the proximity of Cleveland and Indianapolis. The matter was by motion referred to the council of the society for action.

Visit to Ford Company's Plant

The society accepted as recommended practice the Ediswan socket for electric automobile lights. Chairman Churchward stated before the general meeting of the standard committee that a full report could not be made as the sizes of sockets fixed upon by the division would sooner or later have to be made larger to meet the demand for stronger lights. Mr. Churchward stated that the 16-candlepower, 6-volt lamp, as suggested by members of the committee, will give two and one-half times the light of a three-quarter-inch acetylene-gas burner. He therefore believes the now generally used 16-candlepower lamp to be sufficiently large, and that as soon as larger lamps are used there will be legislation against them on account of their blinding other drivers.

President Donaldson Ex-President Souther

Thursday afternoon was spent in an official visit to the Ford plant in Detroit, where open house was held. Henry Ford had previously intimated to Chairman Coffin of the entertainment committee that all locks had been thrown away for the afternoon and everything was wide open but the safe. The engineers spent over 2 hours in the plant. Much interest centered in the almost endless rows of automatic machines that continuously turn out parts for the Ford machines. Next of interest was the great number of multiple-spindle drills, those in some cases drilling holes into the four sides of a motor casting simultaneously. The assembly plant had its stores of interest in the quick dropping of the motor in position by three men; positioning the dash by a single man; mounting the front axle unit; a few minutes later attaching the rear axle unit, and finally bringing the body on and running the car away not long afterward. Many large additions are being made in providing for the extra output of next season.

The Indianapolis section of the S.A.E. had a surprise in store for General Manager Coker F. Clarkson when through spokesman Wall it presented the general manager with an automobile as an indication of the appreciation the section bears for him. As the car had not been selected a tin toy one was presented. Mr. Clarkson was in complete ignorance of the plan to present him with an automobile, but it had been formed several months ago by the members.

President Donaldson's Address to the S.A.E. Convention

IN welcoming the members of the S. A. E. on the occasion of the semi-annual meeting of the society, your president is able to report that the affairs and activities of the Society are in a very satisfactory condition. The growth in influence of the society is reflected in the steady increase in membership, which now exceeds 1,300, a gain of about 60 per cent. over the total membership at the time of the 1911 midsummer meeting.

As you are aware, the Membership Committee has taken hold of the work vigorously and, with the active co-operation of the members, the results have been very gratifying. The work of the committee and the supervision of the council in passing upon the membership applications have been conducted in accordance with the provisions of the S. A. E. constitution.

Since the last meeting of the society in January, the headquarters in New York have been removed from 1451 Broadway, at Forty-first street, to the new twenty-story building, 1786 Broadway, corner of Fifty-eighth street, in the center of the metropolitan automobile district. A serious effort had been made to secure suitable quarters in the Engineering Societies Building, on Thirty-ninth street, but there was no unoccupied space that could be adapted to the uses of our society.

The present quarters are close to all means of transportation on Manhattan Island and provide a practical home for the society on an economical basis. The members' room on the twelfth floor, about 30 feet square, commands a magnificent view of Central Park, Columbus Circle, upper Broadway and the Hudson River. This room has been comfortably furnished for the exclusive use of the members and contains files of the automobile publications, writing desks, stationery, telephone, etc. The management urges all members to make frequent use of the quarters, especially those who live outside of New York and who have need of office facilities during their stay in the city. Secretary Coker F. Clarkson is prepared to give a hearty welcome to all visiting members.

During the past three months the regular monthly publication styled the *S. A. E. Bulletin* has been undertaken and will be continued regularly hereafter. This provides a convenient means for periodical communication to the members of information about the activities of the society. It is in convenient, readable form, so that it can be preserved for constant reference and already has been found to be an effective substitute for the mimeographic sheets which are now used only when it is necessary to send out important notices between the dates of publication of the *S. A. E. Bulletin.*

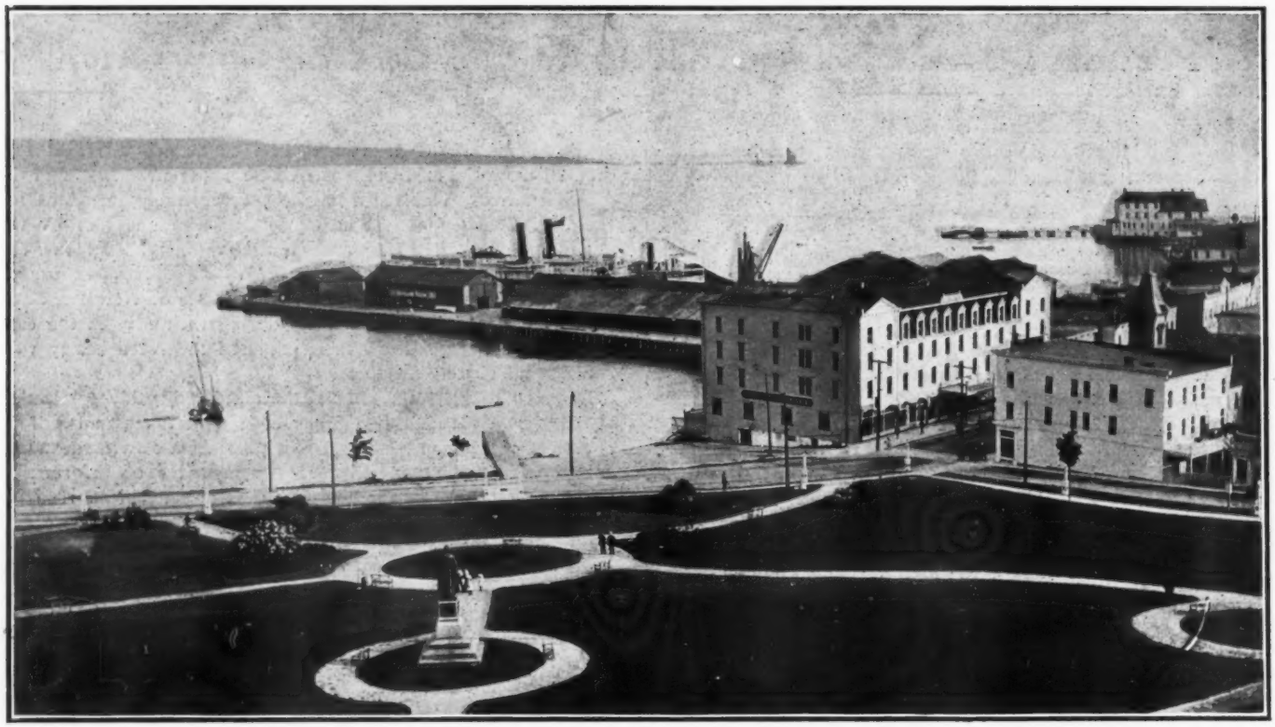
A feature of the *S. A. E. Bulletin* is the listing of "Men Available" and "Positions Available" for the information of the members. This is the outward sign of an employment bureau maintained by the society for the service of which no fees are charged. The bureau has been very successful in filling vacancies for employers and finding positions for members suited to their capabilities.

Band of engineering redskins who entertained visitors

Standards Development Has Been Great

In no other direction has the society so effectively contributed to engineering progress and the good of the automobile industry as in the development of the so-called standards. Of all the activities of the S. A. E., the standards work has been the most discussed—the most praised and the most abused. The society is fortunate in having for chairman of the Standards Committee a member who combines brawn with brain—although up to the present time his combats have been confined to intellectual encounter. An old proverb says that "The proof of the pudding is the chewing of the string," and so while the mastication of the string has occupied the exclusive attention of some, others have already digested the standardization plums and appear to be well fed and happy.

Talking it over between times—although all the conversation was not devoted to technical matters



Looking down upon Mackinac landing and harbor from the old fort on the heights

The angles of approach are a delightfully Euclidean study. Some even assert that the term "standard" is a misnomer, which assertion recalls to mind the Shakespearean reference to a rose. What is a standard? Astronomers tell us that some of the celestial bodies get askew when the notion seizes them so that even such fixed and irrevocable things as stars become unstandardized.

Coming down to earth, we have the case of monetary standards which are not really standard—witness the proposal to coin one-half-cent and three-cent pieces in America, and the abandonment of the guinea, the three-penny and four-penny pieces in England. And so with the standards of weights and measures—witness the sustained effort in England to substitute metric for imperial measures.

Recommended Practice Still Standard

Others suggest the abandonment of standards, foreseeing the impossibility of getting nation-wide acceptance. For such there is encouragement in the history of the metric system. About forty years after its adoption by France, the government was obliged to pass laws providing severe penalties for the use of any other system of weights and measures. The S. A. E. standards have had a more speedy acceptance, even if they have been only "accepted" by the society and not "adopted," a fine distinction that gives comfort to many able minds.

As a result of familiarity already gained in standards work, and having in mind the long continued and highly successful standards experience of the Master Car Builders' Association, the council of this society has decided that in future the conclusions reached by standards committees will be designated "Recommended Practice." When such practice is confirmed by general usage, the term "standard" may be applied. To suggest standards applicable in perpetuity is to assume a lack of information and capability on the part of those who will take up the work of construction and research when we are only a memory.

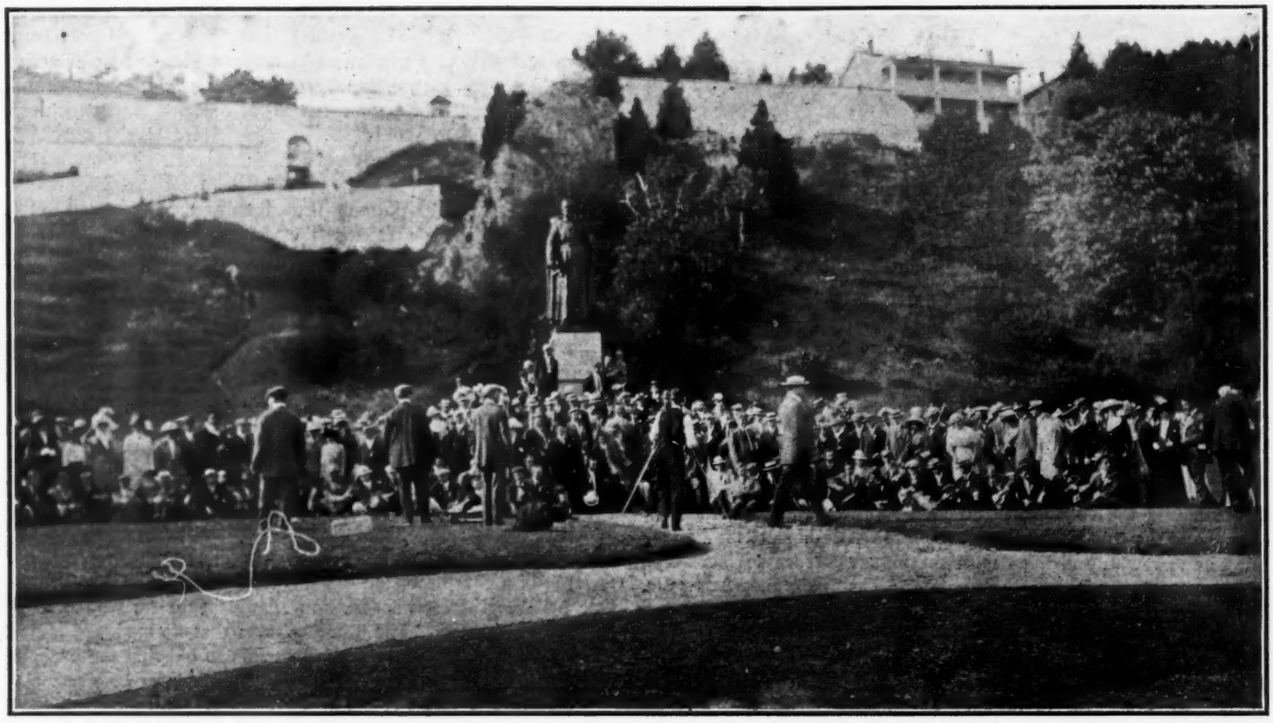
It will be the pleasure of the members to listen to a complete exposition of the scope and purpose of the Standards Committee's work by Chairman Henry Souther at the first professional session of this meeting.

The important work of revising and adding to the S. A. E. handbook has been entrusted to a new professional committee styled the Handbook and Data Sheet Committee. This committee has been selected with a view to the special experience of its members in such work and has now in its possession a large amount of engineering data which will be critically examined and edited for publication. As the work of this committee is one of the most important undertakings of the society—of direct benefit to a large majority of the members—the active co-operation of every member is invited. Contributions of data, whether in tabular or graphic form, or as memoranda, will be thankfully received by the committee. The data sheets already issued are of great value to automobile engineers and are really an indispensable part of the designers' and drafting room equipment.

Every member of this society recognizes that there are many obscure problems connected with the design and construction of motor vehicles that are still unsolved. The habit of mind which is best fitted to cope with problems of production is not the most efficient when applied to the consideration of abstractions. Much good work has been done in the service of motor car manufacturers, but there is always present, even unconsciously, the limiting effect of a salable product, which indeed is the ultimate purpose of the so-called experimental department of the automobile factory. It will, therefore, be of much interest to the members of the industry to know that the society is now in correspondence with the United States Bureau of Standards, in Washington, for the purpose of reaching a basis of agreement whereby the bureau can conduct scientific investigations of problems in carburetion, ignition and the like. It is unnecessary to lay an emphasis upon the value to the industry of determinations reached by the U. S. Bureau of Standards which is pre-eminently the scientific authority in its field in America.

Co-operation upon somewhat similar lines has also been promised by the laboratory of the Automobile Club of America, and the laboratory of the University of Michigan, both of which are well equipped in personnel and material to assure the most valuable results.

Another gratifying development of the standards work of the society is the approval of the S. A. E. motor truck wheel standards by the National Association of Automobile Manu-



The entire party assembled around Marquette's monument on the slope in front of Fort Mackinac

facturers. Also, at a recent conference between members of the S. A. E. Truck Standards Committee and the N. A. A. M. Commercial Vehicle Committee, an agreement was reached whereby the work of the two committees will be co-ordinated, the N. A. A. M. committee confining its investigations and recommendations to standards of a commercial character, and the S. A. E. committee to those of a more technical character, relating particularly to chassis construction. At this conference the cordial relations existing between the two great organizations in the automobile industry—the one commercial in character and the other technical—were strengthened and a united effort for the good of the industry agreed upon.

Your president recommends that a serious effort be made by the society to accumulate historical engineering data for preservation in our library. There are, doubtless, many drawings and photographs of early models now available which will have a constantly increasing historical value and which, owing to their obsolete character and the usual limitations of storage space in a manufacturer's office may be destroyed. It ought to be one of the functions of this society to collect and preserve such material and the co-operation of all members is invited.

In conclusion, your president believes that the society can view with satisfaction the technical work it has already accomplished and use this as an incentive to further and greater effort. As the representative of the technical branch of one of the greatest engineering industries in the United States it has a broad field for usefulness and achievement. And keeping step with its engineering progress the society can fulfill a high purpose in bringing into intimate association the technical men of the industry upon whom its very foundations now repose.

Reports on Standardization Committee Work

DETROIT, MICH., June 29—A standard is that which best endures the test of time; that which changes when demand necessitates, but otherwise stands towering aloft amid the maelstrom, an enduring beacon by which the masses shape their course.

Standardization is the last word in mental satisfaction: The mind craves completeness; it will endure the imperfect, the makeshift, the temporary, all of which become stepping stones to the eventual, only until it can go further towards the goal.

In mechanics standards are accepted practices in design. A score of automobile makers decide on a uniform size of magneto base, they vote their approval, and that size becomes a standard. It may be a standard for a year, for 5 years, or, perchance, for a century—it remains standard practice until those interested declare that it no longer possesses that completeness that conditions demand; then it may be altered into a new standard.

The automobile industry in America has done more to develop standardization in the last 2 years than any other existing industry. Here has been an infant industry, everybody rushing into it and everybody doing everything in a different way. Pedantic engineers refused to imitate established practices and went off at tangents; dark clouds arose. Everything became at sixes and sevens. Makers became laws unto themselves; engineering and manufacturing anarchy was invited.

One automobile engineer would make a water tubing 1-64 inch larger than another simply to be whimsical and different; another insisted upon a special spark-plug size; a third had 100 different sizes of lockwashers in his automobile, when 10 would have been better; to a fourth it was a different size of carbureter flange; a fifth demanded a wheel felloe 1-32 inch wider than his rival; and from Alpha to Omega multitudinous sizes and multitudinous shapes produced confusion and cost of manufacture that worked destruction to treasury reports wherever such prolific extravagances of engineering hallucinations were permitted.

At the crucial moment a solution presented itself. The Society of Automobile Engineers recognized the gravity of the situation, saw the needless cost to the manufacturer of such a promiscuous medley of shapes and sizes, saw the drain on the pocketbook of the owner for hard-to-obtain replacements, and, surveying the troubled waters, appointed an arbiter.

Frank Burgess faces camera C. E. Duryea disagrees

It was a committee on standardization, 100 men selected from the automobile industry, men representing the manufacturer, men representing the consumer, and men representing both the producer and the consumer. This committee of 100 selected a leader, an engineer who had lived with the industry from its inception, Henry Souther. Once a head was selected, it organized for the fray, dividing into committees and sub-committees until the entire field was covered. Then began the campaign. Before standardization could come, present methods must be known. Huge data sheets were provided, sheets on which makers could give all of their sizes for parts, permissible variances in sizes, etc. These reached every factory from the least to the greatest. Some were filled out, some were not. Not until they got these sheets did many makers realize the hopeless situation they had unconsciously drifted into. The data collected were segregated and tabulated, and for the first time the gross irregularity of manufacture and design became apparent. The tabulations were distributed widespread over the industry, and so discussions and conferences eliminated hosts of constructions.

A new dawn was breaking. The light of standardization was breaking across the firmament. Instead of the hundred sizes, makers by vote agreed to accept two or three; the rest went into discard. Soon makers of tubing found it possible to fill orders from stock by return delivery, instead of having to put a special order through the mill, at big expense and long loss of time. Soon the car owner found standard parts creeping into his machine, parts that could be purchased in Galveston or Portland just as well as at the factory. Soon standardization became a boon to car owners as well as to manufacturers.

But there are conservatives and anarchists in every movement, and the standardization conservatives and anarchists soon exhibited themselves. Some engineers imagined that soon their positions would be eliminated, standardization would eliminate them. They imagined the end of their usefulness at hand. It looked to them that all was standardized, even inventive genius. Then opened a guerrilla warfare. There was some fighting in the open, but many preferred the bush tactics.

Souther on Standardization

Once more came a satisfying solution. It came only this week, and the war zone was the Mecca of the industry—Detroit. Chairman Souther, of the committee of 100, led the attack. From start to finish he reviewed the work of standardization by the Society of Automobile Engineers, showed the thousands of dollars it had saved the makers, showed the thousands of dollars it had saved the car dealers and showed the thousands of dollars it had saved the car owners in outlay and in time.

The occasion selected was the annual midsummer session of the society held on board ship between Detroit and Mackinac Island and return on Thursday, Friday and Saturday of this week. Nearly 200 members mustered for the attack, and when led into the fray the advocates of standardization presented so irresistible a battle line that the attacking force was routed.

Chairman Souther opened the engagement in mid-sea, the bosom of Lake Huron being the zone and the aft main cabin on board steamship City of Detroit II the immediate scene of activities. The opening shot was fired at 10 o'clock Friday morning, from which time for over 2 hours he outlined the work from its inception up to the present moment; and where conviction was then wanting, it was secured by a score or more of reinforcements who for a year or more have been making dollars for their factories by utilizing the advantages of standardization.

President Souther presented the work as follows:

The subject of standards and the work of the standards committee of the society seem to be so misunderstood to those not in close touch with the work that a paper of some length, which shall take up the matter in detail, seems desirable. There is a great variety of viewpoints taken by those who comment and criticise.

It is safe to say that all approve of some standardizing work and freely admit that some standards are possible. There is the class which believes that a standard, in order to be worth anything at all, must not be adopted or recommended until everything is known about the subject. In contrast, there is the class which seems to believe almost anything can be standardized and which would go to very great extremes in the matter. There is apparently a sharp division of opinion between these two groups. One believes that standardization should begin early in the history of an industry. The other believes that no standard is possible in an industry until such industry is so old that the probable changes in the proposed standard are few and far between.

Standardization Where Possible

The opinion that standardization should start early in the history of an industry has many arguments back of it. Perhaps the best one is that there are no partial standards that must be undone. The opposite view is that sufficient knowledge does not exist in a young industry to enable a standard to be adopted that will possess any enduring value. It is argued that frequent changes will be necessary and therefore no standard is possible.

In this last phase of the situation, the policy of the Society of Automobile Engineers seems to solve the question. It is believed by the council and those in charge of the society's work that standardization must be started as soon as possible. With this in view, committees having to do with the most recent things in the art are settling upon a few points that all can agree upon at the moment. Then there are a number of other items or points in construction or detail that are questionable as standards. Portions of the sub-committee considering the subject may believe that certain details ought to be standard and other portions of the committee may believe they should not. These

SOME STANDARDISMS

The adoption of a standard is not compulsory; it is voluntary.

Standards should be accepted as readily as possible and kept up-to-date by following the art closely and making such changes as time deems necessary.

To some men the word standardization means the same as the red flag to a bull.

Standardization is not intended to usurp the engineer's position but to facilitate his work.

A standard should represent the collective knowledge of all concerned, rather than the narrow viewpoint of one man or a small group of men.

Affirmative action and approval on the part of the S. A. E. as a whole carries with it the recommendation of the matter as standard.

Standardizing is not hampering inventive genius; it is helping it.

Sufficient knowledge does not exist in a young industry to enable a standard to be adopted that possesses an enduring value.

The records show that all standards have been changed; some of them very seldom and others frequently.

disputed points are fully discussed and the discussions put into the records of the society, so that all members may know what is being considered at the time.

Then there is a third class of information that it is clear to all cannot be used as a standard or as part of a standard. Nevertheless, much of it is excellent material from an engineering standpoint and may even some day come to the quality necessary to form a standard. Such material is put on record and forms part of the engineering knowledge of the society.

The springs division of the standards committee is at this time confronted in a marked degree by the foregoing conditions. There is apparently little that can be even suggested to the society as the basis for a standard; and yet a large amount of engineering data is being gathered by this sub-committee and placed before the members of the society for their information.

The life of a standard is the cause of much discussion. Some believe that if a standard is not everlasting it should not be designated standard, others that a standard is subject to change at any time. Those of the first school would probably adopt but very few standards, for the simple reason that in this age and industry evolution is so rapid that there would never be a time when it would appear that changes were not possible. Consequently, it is the belief of your standards committee that standards should be accepted as rapidly as possible and should be kept up to date by following the art closely and making such changes as may be necessary from time to time.

To me it seems that portions of a construction may be standardized at a given time and that other details must wait further developments. It is most desirable to have the few agreed points standardized rather than do nothing at all.

Makers Demand Standardization

Perhaps the word standard interferes with the understanding of this subject. For instance, a standard pound or kilogram remains the same forever; also the standard foot or meter. There can be no such thing as this in any industry that progresses. It would seem, therefore, that the word standard should be understood as applying not only to those objects which are never to be changed, but also to those that are standard for the time being.

Your committee realizes perfectly well that too many standards, or ill-considered standards, are worse than none at all, and that it must not go too fast. But it also realizes that there are certain things that must be standardized to save untold confusion. It is in receipt of occasional demands from members and from corporations that certain things be standardized. Just at present there is the sharpest possible demand from a large producer of truck axles that the society shall standardize the tread of trucks and a few other items related to the axle. The statement is made by this corporation that if some standard is not forthcoming at a very early date it will create its own.

The whole question of standardization is interesting to the engineering world. It is viewed with the most favor by those who have gone deepest into the subject.

A view of a standard apparently taken by some contemplates the fact that a standard once adopted by the Society of Automobile Engineers must be used by all its members or else they shall forfeit their rights to membership or citizenship or something else not expressed. This is certainly not the case. A standard, in order to be accepted, must have so much merit that engineers or producers or executives will see good reason for its acceptance. Good engineering design may be the reason why it is worthy of universal adoption; easy manufacture may be another reason why it should be adopted and become standard practice; and low cost is a reason why the business organization would say to the others involved that it must be adopted. As a matter of fact all three of these qualities will usually be found in any good standard. The adoption of a standard is not compulsory; it is voluntary.

There are many details that should not be standardized and many that cannot. For example, to set forth a detail standard design for an I-beam front axle or a front axle of any design or shape would be manifestly impossible. The shape and weight of an axle for any given car depend upon so many details connected with that particular car that it might be absolutely wrong for all others. Similarly, a set of transmission gears suitable for one car could never become the standard for all. A set of springs suitable for a given type of car is rarely right for any other; therefore, it is out of the question to attempt to standardize springs as a whole or sets of springs as a whole. A standard engine design would be equally absurd and ridiculous. Such a standard would presuppose absolute perfection in every detail.

Discriminating Is Essential

There are many more details of a car that should not be standardized. To draw the line in a practical way between that which is fit material for standardization and that which is not is the work of your standards committee and of the whole society. A standard should certainly represent the collective knowledge of all concerned, rather than the narrow viewpoint of some one man or small group of men. Various interests must be involved. There are always at least two—the producer and the consumer. There may be several; for example, the producer of the raw material, the manufacturer who shapes it and, finally, the consumer of the finished article. There is usually the sales interest between the other interests.

The standards committee as a whole consists of 100 members. The membership is made up of men possessing every variety of

Carl G. Fisher and William G. Wall D. F. Graham

SOME STANDARDISMS

It is out of the question to standardize springs as a whole or sets of springs as a whole.

Some think that because bearing dimensions are standardized that the materials are; nothing of the kind is possible.

All agree that there are altogether too many sizes of broaches and that standardizing should progress.

There is not any attempt to standardize carbureters, but simply carbureter flanges and gasoline and water connections.

It is a grave question as to how much of an automobile frame is susceptible of standardization.

When the lock washer standardization was started there were 700 different sizes and shapes of lock washers, and now after standardization there are twenty-eight.

Before standardization started there were over 1600 different sizes of tubing; now with standardization of sizes there are 161.

A construction or design that is good becomes standard rapidly.

After a period of probation, extending over an indefinite length of time, recommended practise may be promoted to a standard.

J. G. Perrin wore his smile | Howard Coffin looking for the right door | Kennedy is a trifle skeptical

knowledge in the automobile art; at least such is the intention. The standards committee as a whole is too large to consider originally each and every possible standard as a committee of the whole, and for this reason it has been divided into sub-committees or divisions, consisting of a relatively small number of men, all of whom are interested in and qualified on the particular topic being considered. These divisions are made up as far as possible, and where necessary, of consumers and producers of the object or part under consideration. The chairman of the division, as a rule, suggests certain standards or possible standards. These suggestions are considered at meetings and through correspondence. The consumer expresses his objections to any proposed standard and the producer also states his. Providing they do not get together unanimously, there can be no fully effective standard.

Once a report is made by one of these divisions or sub-committees it is submitted to the standards committee as a whole. The subject matter is put before them in writing and also in open meeting. If the standards committee as a whole approves of the work of the division committee, then the matter goes to the council of the society, carrying the standards committee's recommendation for acceptance. The council decides whether or not it shall be put before the whole society in open meeting for discussion. If so, a printed report is prepared and laid before the whole membership of the society, so that all may be familiar with the substance of the proposed standard. Discussion is invited in every possible manner and adverse criticism usually causes the report to be returned to its division for reconsideration or alteration.

Standards Are Not Unalterable

Affirmative action and approval on the part of the society as a whole, by those present, carries with it the recommendation of the matter as standard. It is then put on record in the Transactions of the society and placed before the membership, for ready reference, in data sheet form in the handbook. This, as already stated, does not mean that the standard can never be changed. The sub-committee are not discharged, but continue their work whenever there is a need for any further change or advance. Every change must receive the same careful scrutiny of sub-committee, full committee, council and society before being recommended.

It seems advisable to summarize the work of the various divisions of the standards committee at this time. Some progress has been made and some standards have been accepted, but there are many more in process of consideration.

As stated, these sub-committees or divisions do not go out of existence because their work has apparently been completed. They are continued in case any new developments in their line arise. There is no better illustration of this than the Aluminum and Copper Alloys Division. Bearing in mind that this division is considering and recommending aluminum and copper alloys, it is made up of four producers and five consumers. In meetings and by correspondence the questions pertaining to this line of work were thoroughly discussed and the conclusion reached that the alloys which they have recommended are suitable ones for the purposes intended. The producing element of the division agrees that it is able to furnish, commercially, alloys containing no more impurities than permitted by the *Society of Automobile Engineers'* specifications. The consuming element has testified, by its acquiescence to these recommendations, that it is satisfied these alloys can be purchased at a right price and that they can be manufactured into the articles for which they are intended without undue cost.

Standardization Helps Buyers

This is very valuable information for the members of the *Society of Automobile Engineers*, whether the results be called a standard or not. It means that a purchasing agent buying for any of the engineers present will be safe in calling for bids for alloys of aluminum or copper in accordance with the specifications as printed. The purchasing department is perfectly sure that it will not be laughed at by the producer because in its ignorance of the technicalities involved it is asking for something that is impossible. It is certain that no fancy price can be justly asked for alloys in accordance with the compositions specified. The production manager knows that he is not going to have any undue difficulty in machining these alloys, because they are made in accordance with the consensus of opinion of those who are experts in the matter. In other words, they are tried alloys, alloys that have been found to be reliable, strong, easy-machining and reasonable in price. The work of this division is finished for the present, but its members are still waiting for any developments in the art.

The ball and roller bearing division has made several reports and has recommended several standards, some of which have been accepted. The work is by no means complete. There are many difficult problems before the division; problems that are delicate and that require careful, conservative scrutiny before any action can be recommended. This division has been able to decide and recommend a nomenclature for bearings of the annular ball type. Any one desiring to order a bearing of a certain

size knows in detail just what he will get. The matter is much simplified in this respect.

The diameter of the bore, diameter of exterior, and axial length of the bearing are clearly defined. Any designer or any draftsman is able to incorporate in his design and drawings definite details with the assurance that what he has pictured may be purchased without extra cost. Many hundreds of measurements are being taken by consumers of ball bearings, to learn what is reasonable and to ascertain what tolerances are permissible and yet will not interfere with the interchangeability of the cooperating parts used by the consumer.

The producer of the ball bearing is equally interested. He wants as great a tolerance as is permissible in order that his manufacturing costs and his rejections, because of inaccuracies, may not be too great.

These two interests are coming together and it is fairly well established at this time that they can agree and that the tolerance under which it will be commercially possible for the producer to work is not too great for the manufacturing accuracy of the consumer. It should be borne in mind that no attempt is being made by producers or consumers to recommend how large a bearing an engineer shall use for any given purpose. That is engineering knowledge; and engineering knowledge cannot be standardized in that sense. One engineer may consider that a factor of safety of ten is necessary under his peculiar conditions. Another may consider that a factor of safety of two is safe under his conditions. Both are equally anxious to know just what a given bearing is like as to shape and dimensions.

To Help Broach Manufacturer

The broaches division is endeavoring to simplify the situation in such a manner that any purchaser may have hope of finding in stock at a reasonable price the broaches necessary for his work. As it is to-day, the broach manufacturer does not dare to carry a stock supply, as does, for example, the manufacturer of twist drills. He has learned by experience that the designer of broached holes will probably call for some peculiarity of detail that will demand a special broach. If a designer has laid down a hole showing corners cut off considerably, the broach must be made accordingly or the gears, for example, will not fit the shaft.

The number of splines and the shape of the splines are being considered; whether three, six or some other number is desirable. It is developing that this is a matter of engineering knowledge, and it may be that this division will decide not to recommend any particular number of splines, but will recommend some definite proportion of depth or width for the spline. All of this can only be possible by entire agreement among all those interested in the subject.

The carbureter fittings division has not completed its work. The definite object of the division is to minimize complication in connection with carbureter fittings. It is a fact well known to automobile engineers, repairmen, and to every one else who has anything to do with carbureters that there are nearly as many designs of carbureter flanges as there are carbureters, and that to substitute one carbureter for another, on any given engine, means some special machine work or fitting. This complication must be done away with; complication means trouble and expense.

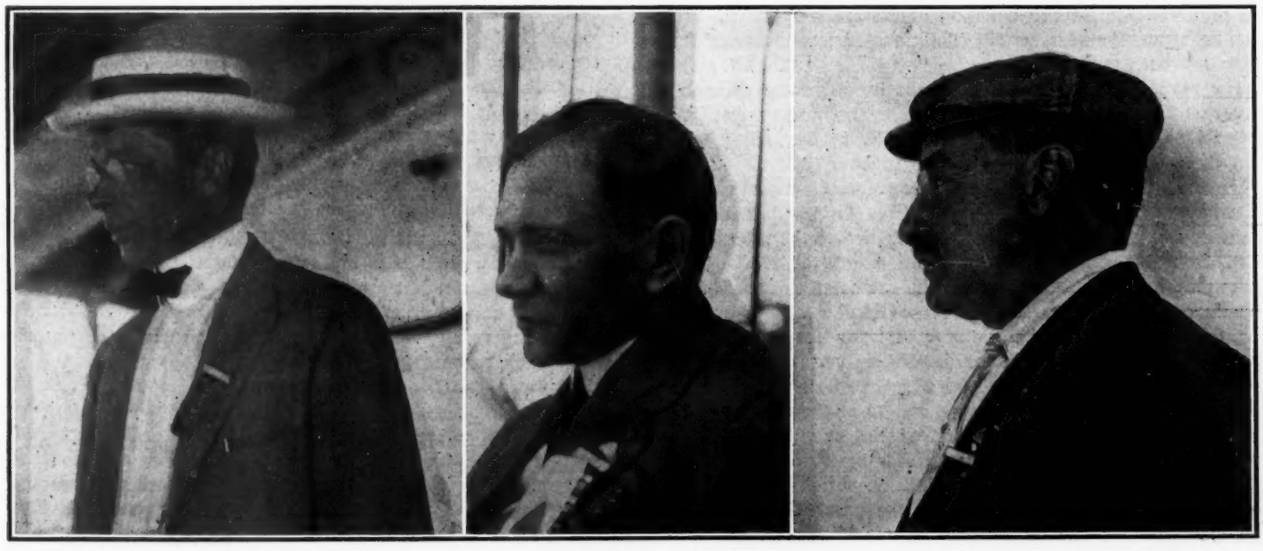
This division is not attempting to design or standardize carbureters. It is attempting to standardize carbureter flanges, and gasoline and water connections, so that all these connections may be readily obtained and readily interchanged.

Carbureter Standards Endure

A draftsman may safely incorporate in the design of an engine such flanges and connections as the standards or recommended practice will show. He will be taking no chances and there will be no experiments involved. And the designer need not fear that his engine will be defective because of inferior carbureter connections. Such standards as these ought to endure for many years or until there is a radical departure from our present system of carburetion.

The work undertaken by the frame sections division is a very difficult one. It is a grave question as to how much about an automobile frame is susceptible of standardization. It was learned that there was a good opportunity for standardizing work; that there was an immense number of shapes differing one from another only very slightly. For example, there were some 700 different curves at the front and rear ends of frames, many of them very much alike. This necessitated a tremendous number of dies and all the attendant expense. Nevertheless, the division has found that the degree of curve depends upon several other items in the design of the automobile; the distance above the ground, the desired flexibility of the springs, including their length and curvature, the method of attaching to axles, method of attaching to the frame, and numerous other details. It has not yet been found possible to arrive at any acceptable standards in these respects, although they would seem very desirable on the face of it.

From year to year the shape of the body changes and necessitates a change in the shape of the frame side bars, perhaps even the weight, thickness and width of the side bars. New methods of construction are discovered, such as spot welding and various other means of joining members. More daring engineering is



Howard Marmon ready to object R. H. Rosenberg incredulous E. T. Birdsall waits for a reply

undertaken and the cross members are incorporated with the side members. All of these details mean change of shape and design. This is one of the best illustrations of the fact that the engineer and his knowledge cannot be standardized. Year after year the engineer must devote his time and energy to the design of a frame which will suit his own particular job, and the draftsman must be carefully guided in every detail in order that the proper frame may be produced. This is not one of the cases where the draftsman can be sent to a data book for standard detail.

The gear tooth shapes division has made no recommendations as yet. It has before it a study of pure engineering, particularly relating to the shape of gear teeth. The automobile engineer knows perhaps better than any other engineer the great importance of exactness as to the shape of the teeth of gears, spur, bevel and spiral. Noise must be eliminated from an automobile, and poor gears are productive of most disagreeable noises.

The work of the iron and steel division is a continuation of that undertaken by the mechanical representatives of the companies that formed the Association of Licensed Automobile Manufacturers. Seven years ago the subject of materials suitable for automobile construction came up for discussion. Their own experience and practices were discussed, and metallurgists and representatives of the steel companies were heard. These men came before the meetings and gave to the members up-to-date information as to the progress of the steelmaking art, and upon this foundation and its yearly development the iron and steel division has built its reports.

Standard Steel Specifications

Specifications for all steels likely to be used by the automobile manufacturer are now before the membership, having been accepted by the society. Engineers may now turn to these specifications and learn what is commercially available and what is safe and reasonable to be incorporated in automobiles. Purchasing agents may safely take these specifications and order materials accordingly. They may feel assured that the materials are not difficult to get and should not carry a fancy price.

It must be borne in mind that these specifications have been closely scrutinized by producers who have been furnishing steel to the automobile industry since its beginning. Equally close scrutiny has been given them by the purchasers who have been buying similar steels for a long time. Both parties have agreed that they are willing to do business with each other on the basis of these specifications, which is very valuable information for our members.

Apart from these specifications, the division has also thought it wise to recommend the printing of certain information as to the proper treatment and handling of the steels specified. What may be expected under certain conditions of treatment and handling has been pointed out.

The reason for the existence of the lock washers division is a very practical one. The lock washer manufacturers found themselves in a very trying position. Every design that came into their office for quotation proved to be a little bit different from any other design previously received. One manufacturer stated that at the time this division was proposed there were some 700 sizes and shapes of lock washers on his books and that, from his standpoint, the situation was absurd. At the same time he did not dare suggest the use of stock lock washers to any of the engineers calling for particular shapes or sizes, for fear of offending the engineer and for fear the engineer had some very good reason for demanding certain very specific details or shapes. There are now 28 sizes of standard S. A. E. lock washers, 16 of the heavy type and 12 of the light type, and these will satisfy all the demands of the automobile industry with the exception of a few special cases.

The benefit of the work of this division permits of no discussion. The engineer, the draftsman, the purchasing agent and the manufacturer are all relieved of much detail work. The engineer instructs his draftsmen to use S. A. E. standard lock washers as far as possible; the draftsman looks in his handbook or in the society transactions and finds the design of the washer and incorporates it in his drawing; the purchasing agent orders a certain number of S. A. E. standard lock washers for a given bolt or screw; the lock washer manufacturer buys his steel of suitable shape from the rolling mill to produce standard washers, and when the order reaches him is able to furnish the standard article promptly.

The nomenclature division is one that is endeavoring to simplify the nomenclature applying to the various parts of an automobile. There is no end of confusion between engineering department and production department, between producers and others, and, in fact, throughout the industry as the result of lack of calling the same things by a uniform name.

The work of the seamless steel tubes division is also the completion of the solution of a problem undertaken by the Association of Licensed Automobile Manufacturers. There is no question about the extreme value of the work of the division and its predecessor. The number of tubing sizes has been reduced enormously—from over 1,600 down to the present number, 161. There is no reason why a designer or draftsman cannot work out any design incorporating one of the S. A. E. standard sizes. This is being done almost universally, and the sheet showing the stock sizes may be found in nearly all the drafting rooms of the industry.

There was a time when the tubing manufacturers received orders for tubing differing in wall thickness or diameter only by thousandths and they were obliged to draw special sizes for these special orders. That day has gone by and it is fair to say that the work of this division is nearly finished.

The sheet metals division has made considerable progress in its work, which has been that of collecting into one document or set of documents data never theretofore appearing together and distributed in any general way. There is a sharp demand from purchasers of sheet metal for more information from this division. It appears that purchasers supposedly well informed as to the purchasing of sheet metals are sometimes confronted with a new demand or a new use. A purchaser knows in a way what he wants, but suddenly finds that he does not know how to ask for it to get just what is desired. The customs and trade names and practices of the men in the sheet metal industry are obscure and confusing. They do not seem to use uniform practices in their industry.

The task before the springs division is an exceedingly difficult one. It will never be possible to standardize a full set of springs, for very obvious reasons. Every engineer has his own idea of flexibility and as to the many details of the length, shape and number of leaves in a spring. Nevertheless, it seems to be possible to standardize certain features of spring construction.

Much of the work of the division is sure to take the form of notes on good spring practice. As stated earlier in this paper, the division has done considerable work in connection with nomenclature, the width of springs, the sizes and proportions of center bolts, nibs, rebound clips, threads, specifications for ordering leaf springs, etc.

Truck Committee Collecting Data

The truck standards division will attempt to recommend standards for a new industry as fast as it can arrive at definite conclusions. At any rate, it is accumulating all the data possible relating to trucks, and these data will be immediately available and result in sufficient knowledge to enable us to recommend any reasonable standards that may be called for.

How much can be standardized and how rapidly the work can be done remains to be seen. The division is on duty with the purpose of advancing as rapidly as seems safe. It would seem that if axle builders can attempt to standardize their output at this time, the engineers who will purchase and use the axles ought certainly to have a hand in the effort. The axle manufacturers express their willingness at this time to modify their designs in deference to the ideas of the engineers. But if

the matter is delayed too long they will not be so willing, and the inevitable result will be friction between consumers and producers.

The work of the wheel dimensions and fastenings for tires division has been startling in its success. The situation was apparently an impossible one when the division took up its labors. There were a dozen or more makes of tires and styles of tires, and for every nominal size there was a different actual size. The differences were small but important in the mind of each of the manufacturers of the tires. The conditions existing in the truck factories were intolerable. It was common for a truck manufacturer to have from five to fifteen trucks standing ready for delivery with the exception of wheels and tires. Special wheels had to be ordered and the order depended absolutely upon the tire specification. There was no possibility of stocking with either the wood wheels or the tires.

Demands reached the division from all sides—particularly from the manufacturers of trucks—asking that something be done. The work has been done and the result is already perceptible. The tire people are satisfied, the wood wheel people are satisfied, and the manufacturers and producers of trucks particularly are satisfied. Certain small details are still under consideration, but so many of the important details have been handled successfully that the former now seem small and insignificant to all concerned.

The spark plug shell is a standard which also came from the A. L. A. M. The miscellaneous division was called upon to specify a tolerance for the thread, so that the plugs would be interchangeable in threaded holes. This demand came from the consumer of the spark plugs, and definite knowledge and a definite practice must be established. The division felt that the thread should measure zero plus and .003 inch minus. As soon as this was tried, it was found that a standard method of measuring would have to be decided upon.

All of this sounds like small work—too much a matter of detail—but, as a matter of fact, once these details are taken proper care of, an amount of friction out of proportion to the size of the detail will disappear. The spark plug manufacturers are just as keen for this accurate knowledge as the users of the plugs. Some body of men must establish a standard practice, and there is no better body of men to do it than the miscellaneous division of the standards committee.

Some years ago a demand for a fine screw thread was felt. A committee of the A. L. A. M. answered this demand and established a standard. The screw companies took it up with some reservation. Consequently, the producers of screws and the consumers of screws did not get together fully at the time in question. The differences were slight and have since been reconciled, and the standard as it is now accepted by the society is one that has been adopted by both producer and consumer without reservation.

To Standardize Gearshift Gates

Standardization of gear shift gates was proposed to the miscellaneous division insistently by several designers. The division did not believe it possible to standardize any such detail, but after full discussion the matter was handled by a recommendation of the division as to preferred practice. Sketches indicate the several possible choices and the preferred practice may be followed by all who want to get as near as possible to standard construction. Should this preferred practice prove, by general and constant use, to be a decided advantage, it is not unlikely that it might become standard in fact if not by recommendation of the division. A construction or design that is good becomes standard rapidly.

Magneto Dimensions—Here is a subject that has been an annual target for criticism. Motor builders and car builders cannot understand why the magneto people cannot get together and make their instruments in such a way that they may be interchanged easily on an engine or in any car. The miscellaneous division has brought about the acceptance of two extensive tables of dimensions of magnetos, one for 4 and one for 6-cylinder engines, which tables differ as to two items only. At present a designer is able to so arrange his motor as to accommodate the largest magneto found in the tabulated information given. By so doing it is possible to locate all the smaller instruments in the same space. There is no difference except as to taper of shaft, in the case of the 4 and the 6-cylinder instruments, and a slight difference in the distance from the center of the two front base-plate holes to the large end of the taper shaft. The latter difference is but a millimeter, and may be reconciled by elongating the hole.

General discussion on the merits of standardization followed:

Charles E. Duryea, C. E. Duryea Company, said: I have nothing to say but appreciation of the work the standards committees have been doing. I have seen but one word that I wish to criticize in the entire report and that is "tread." We should use gauge to designate the distance between the right-hand wheel and the left-hand wheel, as used in railroad practise. The word tread really refers to the width of the individual wheel or tire.

H. W. Alden, Timken-Detroit Axle Company—Two years ago at the midsummer session of the society in Detroit there was criticism on the undue activity of the S. A. E. in its standardization work, which criticism was felt keenly by the council and the old members of the society. We brought matters to a head and had a vote. In the last six months the standardization work has called forth much criticism, some good and some caustic. I think that right now we should get the general view of the members of the society on the work, whether they are in favor of or against the work.

Coffin Points Out Some Difficulties

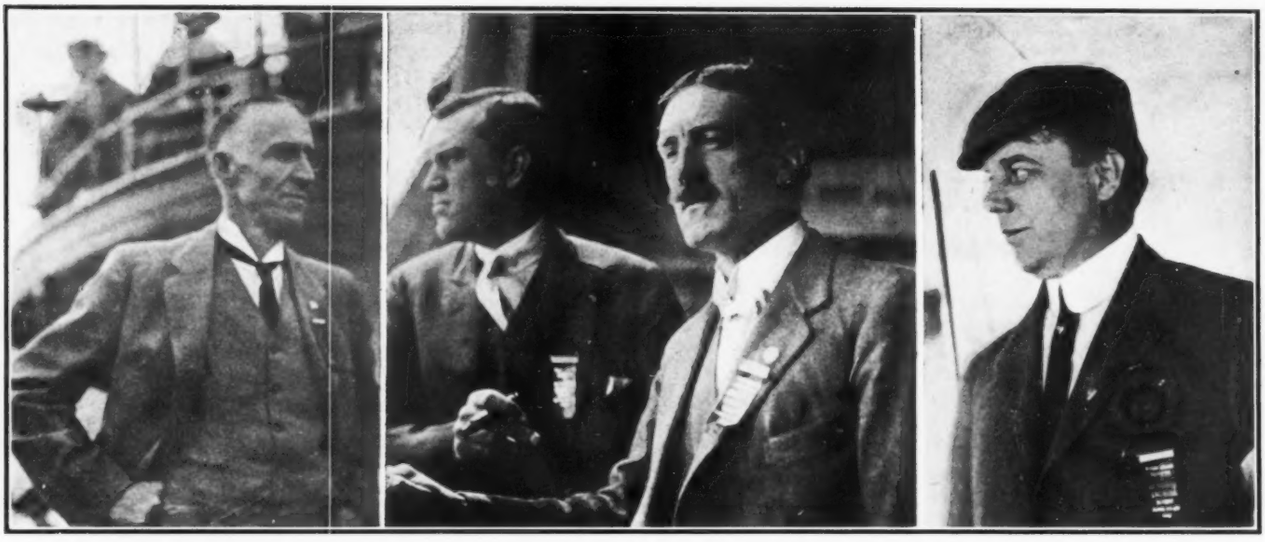
Howard Marmon, Nordyke & Marmon—I have nothing of moment to add. The thought has been broadcast in many minds that the standardization work of the society has been designed to usurp the work of the factory engineer whereas it has solely been intended to facilitate it.

L. J. Flint, Grip-Nut Company—I should like to know what has been done in the matter of bolts and nuts. The Society of Mechanical Engineers has never been able to decide the question of standard weight of bolts and nuts, and I think it would be well if the miscellaneous sub-committee of the standard committee would take this matter up; it would greatly facilitate much work to have these weights standardized.

Clarence E. Whitney, Whitney Manufacturing Company—I am in full appreciation of all the work that the standards committee has done. The company I represent has already saved many dollars by working toward the standardized sizes set by the society.

Howard Coffin, Hudson Motor Car Company—I would like to add one thought: In all activities we must have conservatives and anarchists. We will have suggestions sent in for standardization work which are absolutely foolish, as an example, the standardization of threads for hub caps has been suggested and it was immediately decided that such was too much a matter of detail and the subject was dismissed. The real energies of the standards committee will be exercised along sane lines and for the general good. Often the various standard sub-committee will send out letters containing foolish suggestions for standardization work. The committee knows them to be foolish, but it feels called upon to leave the disposition of them to the entire committee.

H. W. A. Brewer, London, Eng.—One of the points which has interested me most is the business way in which the affairs of your society are conducted. For many years our engineering associations in England have been attempting to standardize work, but to date I have not received any information as to what they are actually accomplishing. I have shown the data sheets issued by your society to English engineers and they are absolutely surprised at the amazing progress you have made here. I think that for a go-ahead nation and a society of such that you mix up dimensions a little; for example, I



F. H. Floyd defiant H. L. Pope annoyed E. W. A. Brewer perplexed Clarence E. Whiting amused

note on some of your sheets some of the dimensions are given in decimals expressed in thousandths of an inch and in another place you express dimensions in sixty-fourths of an inch. This is bad. Further, in going through your standard reports there are certain search-light paragraphs which it would be well to print on small cards for general distribution to the industry. For example:

"Standardization is the last word in a practice.

"Standardization has no regard to materials used but only to shapes and sizes."

I am particularly interested in the standardization of fittings for carbureter attachments and connections. We in England import many American cars and our motorists are very particular in the matter of cost of gasoline and also tire cost. We often want to change carbureters, and as it now is, it costs as much to install the new carbureter as the carbureter costs. This is due to the new manifolds and new gasoline and water-pipe attachments needed. In addition the car owner loses a week's use of his car while the work is being done.

David Fergusson, Pierce-Arrow Motor Company—There is absolutely not any criticism to make on the work of standardization as outlined by Chairman Souther. There is a little criticism on certain points that certain sub-committees of the standards committee may take up with the object of standardizing. One thing of this nature is the absurdity of trying to standardize truck speed. Placing a maximum speed of 8.5 miles on a 5-ton truck is absurd, as the Pierce truck is made for 13 miles per hour. I think that there are many lines in which a speed of 8.5 miles per hour will not pay. In the matter of tire sizes and wheel dimensions the committee has done good work, but there seems to be something wrong in the way the work has been carried out. On our truck we have adopted the Goodrich tire and we have to put a metal band over the wheel in order to accommodate the tire, which is not an S.A.E. standard tire size.

President Donaldson informed Mr. Fergusson that the truck speeds referred to were not S.A.E. recommendations, but merely the desires of makers as taken by a straw vote, and, further, that the National Association of Automobile Manufacturers had adopted a schedule of truck speeds which were lower than these mentioned.

Kennedy Discusses Truck Work

W. P. Kennedy, New York—Regarding standard sizes of truck wheels and tires, I want to corroborate President Donaldson as to proper truck speeds, as the truck committee has not made any recommendations on this question. The committee on wheel dimensions and tire fastenings for trucks has nothing to do on tire sizes. Our work was to standardize wheels and our recommendations ended with a definite idea on felloe bands as recommended by wheel makers. Before our recommendations wheel makers had to carry in stock months before they got their orders vast quantities of materials amounting to many thousands of dollars, but with the standardizing of sizes this money was put into other uses. Today nearly all of the tire makers for commercial motor vehicles are working to S. A. E. standards.

D. F. Graham, Bower Roller Bearing Company—Regarding the bearing division of the standards work much can be said. The work of this committee has benefited the makers of bearings and also the makers of cars in that it is very much easier for the bearing makers to get together in regard to tolerances allowed as to just how much the bearing shall vary from the standard one way or the other. The amount of variance permissible in housings for containing bearings has certainly been simplified.

J. G. Perrin, Lozier Motor Company—We are all impressed with the possibilities and impossibilities of standardization. The change of name from Standard to Recommended Practice will aid in the movement and broaden the scope of the work. I think a great deal of good has been accomplished. In many fields the standardization work has quickened competition. An example: A popular maker of magneto or carbureter uses many unstandard sizes and so it is almost impossible for the maker to attach another make because of these sizes, but when all parts are made to standard sizes it will not be much of a task to substitute any make for any other make of part.

Wall Ventures a Suggestion

William G. Wall, National Motor Vehicle Company—We use many standard parts. I have always been a believer in the standardization work of the S.A.E. I have one suggestion, namely, in the matter of standardized yokes and rod ends. This work was taken over bodily from the Association of Licensed Automobile Manufacturers and these standards were set four or five years ago. Our ideas of wearing surfaces have changed since then and it may be these should be changed.

Regarding Mr. Wall's communication concerning yokes and rod ends, President Donaldson explained that the society had taken over the work of the A.L.A.M. and that the A.L.A.M. had issued one set of standards years ago which were revised before being handed over to the S.A.E. and that since taking them over, the standards committee has revised them twice.

C. T. Meyers, General Motors Company.—I have had to do only with truck construction and in nearly every case we have adopted or arranged to adopt S.A.E. standards and in

all new designs we are laying down we are working to S.A.E. standards. It is very important in truck manufacture to use standard parts as spare parts must be carried in stock in the branch houses and agencies all over the country.

H. L. Pope Manufacturing Company—The work of the standardization committee should be highly complimented. In our legal courts we fight for years on matters in litigation and often previous decisions are reversed and so we should not be surprised at sharp contests in this work. If I have troubles with working any standard part into a car I generally find two or three ways out of the difficulty, and where any engineer cannot follow the work he can write to the committee.

C. R. Watson, Cadillac Motor Car Company—My views of the questions of standardization are different from many others. I work for a concern that gets vast benefits from standardization work. The internal standardization work of a car building concern is important, where all parts of the motor must fit perfectly, the piston, the cylinder, etc. In such a car there is a benefit to every owner. How does the world-wide garage man receive such standardization? He wants to carry the smallest stock of spare parts possible and when a car comes in for repairs he wants to make the quickest possible repair. He wants to do that work without needless expert repairmen. If the parts are all of standard size this can be done, if not he needs expert help, which costs much, the car owner paying the bill.

Steinmetz Favors Standardization

J. A. Steinmetz, Janney, Steinmetz & Company—We make seamless steel gasoline tanks and standardization aids very much. We make standard diameter tanks and a change of 1-16 inch in diameter from these standards costs the automobile maker perhaps $1,500 to $2,000 a year. We require dies for our work and the more dies the more cost. Within the last two years we have changed 50 car makers over to standard sizes and saved each over $3,000 per year. We have also come to use the standard iron pipe size of tank fillers and caps, caps for you which you can purchase at a small price all over the country instead of using the high-priced heavy brass caps of non-standard size and which are so difficult to secure.

L. S. Bowers, Schwarz Wheel Company—I speak as a wheel maker. We are vitally concerned in the development of these standards. Before the adoption of standard wheel dimensions for trucks it was impossible to make up any stock for customers as nothing could be done until the customer's specifications were in. Since the adoption of the wheel standards we can make up felloes long in advance and can also carry truck wheel bands and so are in a position to give quick delivery. The standards mean economy to maker and owner. It was my understanding the tire makers would all come to making standard sized truck tires and we should all get after them.

Chairman F. E. Moscovics, of a special advisory committee on magneto standardization, read the report of a meeting held in Indianapolis May 31, 1912, in which 95 per cent. of the magneto manufacturing interests were represented. The report showed that the magneto makers agreed that standardizing the following named magneto parts should be taken up and considered by the standardization committee: Shafts; base height; location of studs, or holes, in relation to the key point on shaft; overall dimensions; length of advance lever and the standardization of holes in the advance mechanism, and the relation of keyway setting in armature shaft to the moment of break in the breaker mechanism.

Recommendations of the Committee

The committee recommended adoption of a standard taper shaft for four and six-cylinder magnetos. The length of the taper was put at .5905 inch; the large diameter of the shaft at .5905 inch; the angle of taper 5 degrees and 45 minutes, and the small diameter of the shaft .472 inch. To be furnished with No. 3 Woodruff key.

Further recommendations of the committee were: First—The adoption of a thread for the end of the magneto shaft of 3.8, 16 threads U.S.F., the length of the thread to be .5905 inch. Second—That in the base height the distance from the center of the armature shaft to the base be 1.771 inch or 45 millimeters. Third—That for two-magnet machines there be used from the center of the first bolt hole to the large end of the taper a dimension of 2.086 inches. Fourth—That the size of the hole on a two-magnet machine be 3-8, 16 threads U.S.F. Fifth—That owing to the declining business in three-magnet machines no cognizance be taken of standardizing those parts and that manufacturers requiring those instruments for special purposes or on exceptionally large motors can very handily obtain the information by writing to the different magneto manufacturers. Sixth—That engineers allow a sheer clearance of 8 inches from base height to top of magneto space, a width of 5 inches and an overall length of 10 inches. Seventh—That magneto advance-levers have a radius of 2 1-8 inches from the center of the armature shaft and that this hole be drilled to take a tapping hole for 1-4, 28 x pitch thread. Eighth—That the committee recommend that the keyway of the armature shaft should bear a definite relation to the moment of break in the breaker box, when the breaker box is in the full retard position.

C. M. Hall ponders E. P. Batzell meditates David Fergusson reflects

Legal News of the Week

Michigan Supreme Court Reverses Finding of Lower Tribunal in Case Involving Handling an Agency

Wants a Receiver for Motor Starting Company—Court Upholds Gordon Trademark

DETROIT, MICH., July 1—Reversing the Wayne County Circuit Court, the Supreme Court recently held that the verdict rendered below in favor of William G. Isbell, former representative of the Anderson Electric Car Company, for $23,000 for damages by reason of the cancellation of the agency is null and void.

An original contract between the litigants called for the maintenance of a suitable garage for handling automobiles, together with such appurtenances as are usually required in such a business. An auxiliary agreement made soon after the original contract provided for allowing Isbell to place gasoline cars in the garage, as well as those of the electric type, until such time as the business in the latter should have developed to a point where the caring for them offered a sufficient business to warrant their care exclusively.

The Anderson Company later notified Isbell that he was not caring for the business properly; did not advertise sufficiently; did not provide proper labor for caring for the business, and was not carrying any of the cars in stock. The result was the cancellation of the agreement.

Isbell brought suit and was awarded $23,000 damages in the lower court. The appeal to the higher tribunal, however, brought a reversal.

Marking Out the Scope of Agency

That an action by a principal for money had and received is appropriate to recover profits from an agent who, contrary to his agreement to sell certain goods of the plaintiff company exclusively, broke his agreement and sold a similar line of goods in competition with that of his principal, was held recently in the case of Robert Reis & Company against John E. Volck by the Appellate Division of the New York Supreme Court.

While no patent rights were involved in this dispute, the general rule laid down by the court proves interesting and important to the automobile trade.

In lay terms the court holds that where an agent contracts to sell a certain line of goods exclusively and violates his agreement, becoming a competitor of his principal, a suit by the principal will lie to recover the profits made by the agent through the unfair competition inaugurated by him.

Ask Receiver for Starter Company

INDIANAPOLIS, IND., June 29—Suit has been brought in the superior court at Indianapolis by the Indianapolis Light and Heat Company asking that a receiver be appointed for the Motor Starting Company. The suit was brought on an account of $116 for electric current, and it is charged the concern, which has been manufacturing a motor-starting device, is insolvent. Lew W. Cooper, formerly president of the board of public safety, is president of the company.

Cut-Out Law in Effect July 16

July 16 is the date upon which the new muffler cut-out ordinance goes into effect in New York. The investigation of the subject of cut-outs and their relation to lost power, upon which the metropolitan lawmakers relied for some of the data presented before that body, was undertaken by the Touring Club of America and showed that the cut-out added only a small fraction to the power of the motor, while the noise resulting from running without the muffler proved sufficiently annoying to a large number of citizens to raise a prejudice in their minds as to automobiling in general.

The movement culminated in the following ordinance, which was duly endorsed by the aldermen:

Section 1. Every motor vehicle propelled by an internal combustion engine, when such vehicle is on any street, road, avenue, alley, park, parkway or public place within the city limits shall, when such engine is running, be equipped with a muffler or silencer, through which all of the exhaust gases from the engine will escape into the atmosphere.

Section 2. It shall be unlawful for the operator or driver of any motor vehicle to use any cut-out, fitting or other apparatus, or a device which will allow the exhaust gases to escape into the atmosphere without passing through a suitable muffler or silencer as described in Section 1.

Section 3. Any person violating the provision of this ordinance may, upon the conviction thereof by any city magistrate, be fined a sum not exceeding $10, and in default of payment of such fine may be committed to prison by such city magistrate until the same be paid, but such imprisonment shall not exceed 10 days.

Gordon Trademark Is Upheld

CHICAGO, ILL., July 1—Suit of the Vehicle Apron & Hood Company against the American Tire & Rubber Company, based upon alleged unfair competition of the defendant company in substituting other tire covers when the Gordon tire cover of the complainant was named by purchasers, has been decided in favor of the complainant.

Judge Kohlsaat of the United States District Court has signed a decree perpetually enjoining the defendant from such practices and from the use of the trademark name, Gordon, in connection with any other than such tire covers. The defendant is ordered to pay the costs of action.

Makes Car "Borrowing" a Felony

The assistant United States attorney says the Government is planning to co-operate with the police and court in stamping out if possible the practice, now almost of daily occurrence, of taking motor cars and, after using them for joy rides, abandoning them. A special law to cover cases in which the grand larceny charge would not hold, where motor cars are taken without right, will be asked of Congress. A bill framed with the co-operation of the United States attorney's office will be presented to Congress at an early date.

Enjoins Individuals, but Not Union

BUFFALO N. Y., July 2—Judge Hazel in United States District Court has fined Charles Stemp, Andy Smith and William Hopkins, $100 each for violating a federal injunction restraining them from interfering with the strike breakers in the plant of the Aluminum Castings Company, Elmwood Avenue, which concern makes aluminum castings for automobiles. Judge Hazel denied the motion of the Aluminum Castings Company to make permanent the injunction against the molders' union, but the injunction against the individual striking molders, however, is continued. The penalized men are being held until the fines have been paid.

Defends Quebec's License Law

MONTREAL, June 25—"The province is licensing chauffeurs and not engineers," said Wallace Dawson, collector of provincial revenue, who has charge of the issuing of licenses, when questioned regarding the comments on the government's method of examination made by a local association of chauffeurs. "The province requires that a man be competent to conduct a machine, and not to manufacture. The question as to hair, eyes, etc., serves a twofold purpose—in case of an accident to identify the chauffeur and to prevent a transfer of licenses. Every chauffeur must carry his license with him, and the description must tally

with the person who holds the same. Have you served in a penitentiary? is a query as to whether the applicant has been convicted under traffic law in any country. The query as to occupation is to establish whether or not the applicant is to act in capacity of operator or chauffeur.

"The mechanical end is taken care of," said Mr. Dawson, "in that an applicant must have three witnesses over 25 years old who swear under oath that they are personally acquainted with him; how long they have known him; that they believe his statements as to knowledge of the machine to be true; that the applicant is not in any way, physically or mentally, incapable of handling a motor vehicle, and that they believe him to be competent, and the applicant is required to state under oath the power of vehicle previously operated and the number of miles run."

Western Transferred to Rutenber

CHICAGO, July 2—The incorporation of the Rutenber Motor Company for $1,350,000 in Delaware last week was the forerunner of an important change in the Western Motor Company, of Marion, Ind., which long has manufactured Rutenber motors, in that it marks the transfer of the business of the Western Motor Company to the newly organized Rutenber Motor Company and the infusion of new financial blood in the shape of George W. Bowen, of Auburn, N. Y., president of the Bowen Manufacturing Company, of that city, maker of grease cups and other oiling devices.

Confirmation of this fact was secured today from J. W. Stephenson, general manager of the Western Motor Company at Marion. While the deal has not been finally completed, it is as good as made, Mr. Stephenson says, and Mr. Bowen will be heavily interested from a financial standpoint. The name of the company will be changed to the Rutenber Motor Company and Mr. Stephenson will remain as general manager and a large stockholder. With the new capital interested it is planned to double and probably triple the capacity of the engine plant at Marion.

Innocent Driver Fined for Fake Tag

ALBANY, N. Y., July 2—Because he used a license plate on the rear of his automobile which had not been issued by the Secretary of State, Charles A. Wetmore, representative of a local automobile agency, was arrested Saturday on complaint of Gustave Semmig, inspector in the automobile bureau of Secretary Lazansky's office. It is claimed that the license plate on Wetmore's car was of cardboard, and that the size and also the color of the figures was similar to that of the official license plates. Wetmore pleaded that he knew nothing of the plate being a fake, as he had simply driven the car from the garage on a test trip, and although Justice Brady accepted the explanation, he fined the violator $5 as a matter of principle.

Atlas Engine in Receiver's Hands

INDIANAPOLIS, IND., July 2—Fred C. Gardner has been appointed receiver for the Atlas Engine Works, American manufacturing licensee under the patents of Charles Y. Knight covering the Knight sleeve valve automobile motor. This action was precipitated by the filing of suit against the Atlas company involving the payment of a claim for $2,387. Judge Weir, of the Superior Court, entertained an application for a receiver made by F. H. Wheeler and George M. Schebler. Bond in the sum of $50,000 was filed and the business will be continued.

Officers of the Atlas company have announced that the cause of difficulty lies in the fact that the largest customer of the company has suspended payment temporarily, owing the company about $100,000. At the same time, according to the announcement, a request has been made by this customer to suspend indefinitely all deliveries under the contracts existing between the Atlas company and the customer.

Covers Moving Cars Only

Milwaukee's Universal Light Law Applies To Cars Which Are in Actual Operation

New York State Examiner Would Confine Licenses to Those Only Who Show Ability

MILWAUKEE, WIS., July 1—The universal light ordinance proposed for the city by the Milwaukee Automobile Club, and recommended for adoption by the committee on judiciary, has been amended to apply only to moving vehicles, as there is at present an ordinance in Milwaukee which provides that any vehicle left standing on a street or in an alley must be marked by at least one light visible in both directions. The club endeavored to have its ordinance passed, and the old ordinance abolished, to avoid superfluity and make the ordinances relating to the subject more compact. However, there was danger of losing both ordinances, so the club decided to let well enough alone and have two ordinances to cover the ground which one good statute would cover. The M. A. C., acting with the Wisconsin State A. A., will endeavor to push a universal light law through the next session of the Wisconsin Legislature, convening in January, 1913.

Body Company Suspends Operations

FLINT, MICH., July 1—Following an order made in the United States Court in Bay City, the Flint Body Company has closed its doors. Action in the court was taken by creditors of the concern. An inventory will be taken and the future of the company decided. Robert H. Cook, who was vice-president and secretary of the company, has been chosen by the creditors as receiver. The company was incorporated January 1, 1909, and capitalized at $50,000. William E. Stewart, president and treasurer of the company, was principal stockholder.

No License Unless Competent

ROCHESTER, N. Y., July 2—That every man or woman who drives an automobile in New York State eventually will have to pass a road examination and show a certificate to the effect that the bearer is competent to operate a machine, is the belief of R. H. Strickland, Rochester, state examiner of chauffeurs, who is examining applications for licenses in various cities. He declares that automobiles are being driven by incompetent people without the slightest regard for existing laws concerning the running of these machines. Mr. Strickland, whose headquarters is in Buffalo, declares new owners ought to be required to give demonstrations of their competency in driving automobiles before being provided with a license.

Grossman to Appeal Decision

Formal order has been issued by Judge Hand of the United States District Court, allowing Emil Grossman, nominal defendant in the recent suit of J. H. Sager, involving patent rights on automobile bumper manufacture, to perfect an appeal from the decision of Judge Hough which sustained the Sager patent.

The opinion of Judge Hough was couched in doubtful terms, but the decree granted provided for a permanent injunction and it is from that order that the Grossman party takes appeal. The case in due course will be presented before the United States Circuit Court of Appeals. The actual defendant in the case is the United States Bumper Company of Chicago.

Willys Acquires Garford

Overland Company Purchases Common Stock of Elyria Concern, Which Will Be Operated at Full Capacity

General Vehicle Company Contracts to Build Daimler Trucks in This Country

TOLEDO, O., June 28—Announcement has been made that President John N. Willys, of the Willys-Overland Company, today consummated a deal by which he purchased the common stock of the Garford Automobile Company, of Elyria, O. There is $2,000,000 worth of the stock and the product will be handled through the Toledo sales department of the Willys-Overland Company. The Garford plant in Elyria is capable of employing 3,000 men and the concern makes a high-class six-cylinder passenger car and 2, 3, 4, 5 and 6-ton automobile trucks. With this plant the Willys-Overland Company will make all classes of cars from a low-priced $900 car to the high-priced touring car and automobile trucks. The Elyria plant will in the future be operated at its full capacity. Mr. Willys now controls not only the Overland business in Toledo, but the Gramm Motor Truck Company at Lima, O., the Auto-Parts Company, at Elyria, N. Y., and the Garford Company. They will all become part of the proposed $15,000,000 corporation which will be organized as soon as the secretary of state authorizes the increase in capital stock, application for which will be filed within a few days.

Enormous improvements are planned for the local plant of the Willys-Overland Company, and of the Kinsey Manufacturing Company, both of which concerns will be doubled in capacity. It is expected to turn out 40,000 cars from the local factory during 1913. According to a statement made by a member of the Overland Company, orders for from 2,000 to 3,000 cars have been turned down within the past 6 weeks because of inability to turn them out.

Crude Rubber Market Is Firm

A firmer tone was apparent in the crude rubber markets of the world during the past week. Trade in New York has been of small proportions and most of it was for prompt delivery. A slight hardening of prices was felt and the current level is on a basis of $1.12 1-2 for up-river fine. At the London fortnightly auction, which is scheduled for the first and third Tuesdays of each month, the offerings include 580 tons of plantations.

Barnes Resigns from M. & A. M.

Claire L. Barnes, third vice-president and member of the board of directors of the Motor and Accessory Manufacturers, has resigned owing to a series of shifts in the membership in the association. William H. Crosby of Buffalo was chosen to fill out the unexpired term of Mr. Barnes as director until January 1, 1914.

The following concerns were elected to membership in the organization: Hood Rubber Company, Boston, Mass.; The Lefever Arms Company, transmissions and jackshafts, Syracuse, N. Y., and The American Hardware Corporation, Corbin Screw Corporation, speedometers, New Britain, Conn.

G. V. to Make Daimler Trucks

James M. Carples, general manager of the Daimler Import Company, has made the following announcement:

"Contracts have been signed between the Daimler Manufacturing Company, the General Vehicle Company and the Daimler Motoren Gesellschaft, Germany, for the future manufacture in America by the General Vehicle Company of all the types of commercial vehicles made by our factories in Germany.

"Representatives of the General Vehicle Company have been abroad for the last three months negotiating and carefully looking into this matter.

"As far as the Daimler Import Company is concerned, we shall continue to import both the Mercedes pleasure and commercial vehicles the same as before. Our manufacturing rights for the pleasure vehicle in America have not yet been definitely concluded but negotiations are well under way and I believe that upon the arrival next month of our directors I shall be able to inform you that this has been accomplished and that the Mercedes pleasure car will hereafter be manufactured in America by a syndicate as well known and as well equipped for this purpose as the General Vehicle Company is to make a success of the Mercedes commercial vehicle."

Combine Business with Pleasure

Instead of holding regular meetings in July and August, the National Association of Automobile Manufacturers will combine the two meetings and hold the joint session at Christmas Cove, Me., the summer home of Samuel A. Miles, general manager of the organization. The meeting is scheduled for July 30.

Overland Stocks on 'Change

Application has been made by the Willys-Overland Company to list its stock issues on the New York Stock Exchange and it is understood that such action will be taken. The tradable total includes at least $15,000,000 of securities under the recently authorized increase in capitalization.

Market Changes of the Week

The rise in steel, which began last week, continued, so that now most of the leading makers charge the prices given in the tabulation below. Beams and channels, following the trend of other products, advanced $1 a ton. The activity in steel which has been witnessed by the past few months, continued during the week. Copper presented a restrained situation, so far as dealings in the metal were concerned, while copper securities were subject to considerable changes in the stock market. The air of speculation which has surrounded this commodity, has not as yet been dispersed. Tin and lead experienced a week of moderate activity with insignificant changes.

Gasoline advanced to 20 cents a gallon in 200-gallon lots, which gives a total rise of 6 cents for this fuel since the beginning of the year. At the same time Pennsylvania and Kansas crude remained unchanged. The range of prices follows:

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Week's Change
Antimony, per lb.	.07	.07	.07	.07	.07	.....
Beams and Channels, 100 lb.	1.41½	1.41½	1.41½	1.41½	1.41½	.....
Bessemer Steels, Pittsburgh, ton	21.50	21.50	21.50	21.50	21.50	.....
Copper, Elec., lb.	.17½	.17½	.17½	.17½	.17½	.....
Copper, Lake, lb.	.17⅝	.17⅝	.17⅝	.17⅝	.17⅝	.....
Cottonseed Oil, July, bbl.	6.71	6.71	6.71	6.78	6.84	+ .13
Cyanide, Potash, lb.	.20	.20	.20	.20	.20	.....
Fish Oil, Menhaden	.38	.38	.38	.38	.38	.....
Gasoline, Auto., 200 gals. @	.20	.20	.20	.20	.20	.....
Lard Oil, prime	.85	.85	.85	.85	.85	.....
Lead, 100 lbs.	4.50	4.50	4.47½	4.47½	4.47½	+ .02½
Linseed Oil	.79	.79	.79	.79	.79	.....
Open-Hearth Steel, ton	22.50	22.50	22.50	22.50	22.50	.....
Petroleum, bbl., Kansas Crude	.68	.68	.68	.68	.68	.....
Petroleum, bbl., Pa., Crude	.68	1.60	1.60	1.60	1.60	.....
Rapeseed Oil, Refined	.68	.68	.68	.68	.68	.....
Rubber, Fine Upriver Para	1.10	1.10	1.10	1.10	1.12	+ .02
Silk, Raw Ital.	....	4.15	....	....	4.15	.....
Silk, Raw Japan	....	3.65	....	....	3.65	.....
Sulphuric Acid, 60 Beaumé	.99	.99	.99	.99	.99	.....
Tin, 100 lbs.	47.50	47.50	47.00	47.00	47.00	— .50
Tire Scrap	.08½	.08½	.08½	.08½	.08½	.....

Big Increase in Exports

As Compared With May, 1911, Value of Automobiles and Parts Shipped Abroad Almost Doubled

Slight Increase in Imports—Ascribe Slump in Millinery Trade to Automobiles

WASHINGTON, D. C., July 1—The value of automobiles and parts exported from tne United States during May, 1912, was almost double that exported during May, 1911. Canada, as usual, bought almost half of the exports sent abroad by this country, the total for May, 1912, having been $1,352,856. This was an increase of $245,751 over the corresponding month of last year. The exports to the United Kingdom, it is noted, were more than double those of May, 1911.

Probably the most remarkable increase of all, though, was in the exports to British Oceania, which were but $109,813 in May of last year, and jumped to $412,565 in May of this year. Asia and Oceania also showed a big increase, the exports growing from $61,765 in May last year to $149,309 in May this year.

The most interesting figures, however, are in comparison of the totals for the 11 months ending May, 1910, 1911 and 1912 respectively. These show that the 1912 figures are approximately two and one-half times those of 1910, and more than $9,000,000 in excess of those of 1911. The proportion of increase of 1912 over 1911 is about twice that of 1911 over 1910.

The imports for the same period covered by the report of exports show a slight increase as between May, 1911, and May, 1912. The imports from France and Italy show an increase, by comparison, but those from the other countries show a falling off. The tables follow:

COMPARATIVE EXPORTS OF AUTOMOBILES AND PARTS FOR MAY, 1911 AND 1912

	1911		1912	
	Number	Value	Number	Value
Automobiles, and parts of—				
Automobiles	1,466	$1,513,547	3,009	$2,963,818
Exported to—				
United Kingdom	....	203,539	673	465,722
France	....	71,922	63	48,980
Germany	....	19,972	49	36,719
Italy	....	22,125	30	35,605
Other Europe	....	89,554	204	155,125
Canada	....	1,107,105	1,109	1,352,856
Mexico	....	11,990	8	15,370
West Indies and Bermuda	....	27,436	29	36,237
South America	....	104,172	162	183,292
British Oceania	....	109,813	445	412,565
Asia and other Oceania	....	61,756	152	149,309
Other countries	....	28,042	85	72,038
Parts of (except tires)	....	343,879	....	448,972
Total	....	$1,857,426	....	$3,412,790

COMPARATIVE IMPORTS OF AUTOMOBILES AND PARTS FOR MAY, 1911 AND 1912

	1911		1912	
	Number	Value	Number	Value
Automobiles, and parts of—				
Automobiles	75	$158,046	76	$165,759
Imported from—				
United Kingdom	19	36,941	11	28,324
France	26	62,442	41	95,965
Germany	13	26,460	5	10,114
Italy	7	12,709	11	17,424
Other countries	10	19,404	8	13,932
Parts of (except tires)	..	47,846	..	21,493
Total Automobiles and parts of	..	$205,892	..	$187,252

Automobile Securities Quotations

In the list of automobile securities the stock changes for the past week did not develop anything startling. The waiting attitude noted during the week previous was if anything more pronounced than ever. This condition kept the investment issues extremely solid but naturally developed a slight drop in the speculative shares, with, however, a few exceptions where a 1-2 point rise was noted. The asking price in the gilt-edged issues still shows no tendency in falling off, indicating a substantial condition in these shares and an encouraging condition of the industry. The following table shows the comparison of this year's prices with those of 1911 at the corresponding time:

	1911		1912	
	Bid	Asked	Bid	Asked
Ajax-Grieb Rubber Co., common	...	...	110	...
Ajax-Grieb Rubber Co., pfd	...	...	93	100
Aluminum Castings, preferred	...	...	100	...
American Locomotive, common	41	42	43¼	43½
American Locomotive- preferred	109	110	109	110⅜
Chalmers Motor Company	...	...	140	155
Consolidated R. T. Co., common	5	11	14	16
Consolidated R. T. Co., pfd	10	20	55	59
Firestone Tire & Rubber Co., com	163	168	276	282
Firestone Tire & Rubber Co., pfd	102½	105	106	108
Garford Company, preferred	...	...	90	100
General Motors Company, common	53	54	32	33
General Motors Company, preferred	88	89½	74	75
B. F. Goodrich Company, common	238	241	79¼	80¼
B. F. Goodrich Company, pfd	115	116	108¼	108¾
Goodyear Tire & Rubber Co., com	210	215	265	275
Goodyear Tire & Rubber Co., pfd	104	105	100	102
Hays Manufacturing Company	...	...	...	104
International Motor Co., com	...	...	23	25
International Motor Co., pfd	...	...	86½	88
Lozier Motor Company	...	...	45	55
Miller Rubber Company	...	...	160	165
Packard Motor Co., preferred	...	...	104½	106
Peerless Motor Company	...	...	...	...
Pope Manufacturing Company, com	51	53	30	32
Pope Manufacturing Company, pfd	77½	79	73½	75
Reo Motor Truck Company	8½	10	9	10
Reo Motor Car Company	23	25	22½	33½
Studebaker Company, common	...	...	34½	35½
Studebaker Company, preferred	...	...	90	92
Swinehart Tire Company	...	...	104	106
Rubber Goods Company, common	88	92	100	...
Rubber Goods Company, pfd	100	104	108	...
U. S. Motor Co., common	40	42	3	3¼
U. S. Motor Co., preferred	82	83	13	14
White Company, preferred	...	...	107½	109

Big Addition to Morrow Plant

ELMIRA, N. Y., July 2—A mammoth addition to the already large plant of the Morrow Manufacturing Company, South Main and Scott streets, was opened today with the employment of 300 additional skilled mechanics. This company manufactures transmissions and small parts for Overland automobiles for the Willys-Overland Companies at Indianapolis and Toledo, O. Before the new addition was opened for business the concern turned out an average of 130 transmissions daily, and with the additional workmen and the annex to the large factory it is proposed to manufacture at least 200 transmissions every day solely for Overland cars. At least 70,000 pieces for automobiles are made daily, totaling 16,998 pounds of finished material. The work is mostly done with automatic screw machinery and each separate piece must be carefully inspected before shipment is made. Besides spending $1,000 weekly for materials as lumber, hardware, etc., for use in the plant, the weekly payroll of this concern totals $10,000 without including foremen, office men or officials.

Company to Make Martin Tractor

INDIANAPOLIS, IND., July 2—The Martin Tractor Company has been organized and incorporated with an authorized capital stock of $50,000 to manufacture the Martin Tractor in this city. The incorporators include: Charles H. Martin, Hugh R. Richards, F. B. Davenport, Edward D. Moon and George D. Thornton.

Automobile Hurts Millinery Trade

LOUISVILLE, KY., June 29—The modern motor car, with its attendant veil, donned by women autoists, because of damage the wind does to hats, is responsible for the falling off of trade in the millinery line, according to A. O. Niedlander, of Indianapolis, president of the Millinery Traveling Men's Association. The statement was incorporated in the annual report of the president of the association, which was read at the opening session of the convention at the Hotel Henry Watterson this week.

Detroit's Building Boom

Many Companies Putting Up New Structure and Additions to Present Ones —Tire Exports Increase

Horace DeLisser With Ajax Rubber Company—Carter Corporation Plant Sold

DETROIT, MICH., July 1—After a comparative lull in factory expansion locally, building operations seem to have been resumed this summer on a comparatively large scale. The largest addition of which formal announcement has yet been made, is that of the Chalmers Motor Company, which has authorized and will immediately begin construction of a new factory building, adjoining its present plant. The building will be four stories in height, conforming in materials and general design to the buildings already in use by the company. The length will be 191 and the width 71 feet. In the neighborhood of 55,000 square feet of floor space will be added to the plant. Arrangement is also being made by the Chalmers Company to still further increase its facilities by the erection of another building, also four stories high, and 400 by 60 feet. This will be practically a duplicate of the two main buildings of the present plant, each of which conforms to this size. The Chalmers Company has more than 30 acres of room and has ample chance for expansion.

Building operations will, it is understood, soon be begun by the Cadillac Company, which has been severely cramped for room during the past two seasons and is at present using an immense tent near its plant. No definite announcement has yet been forthcoming, however.

The Briggs-Detroiter Company has authorized a large addition to its plant north of Detroit, on the line of the Grand Trunk & Michigan Central, Bay City division. This company is one of the most prosperous of the smaller local factories and has been absolutely unable to fill its orders during the season, which is its first. The new addition will almost double the capacity of the plant.

Building operations are also in progress at the Studebaker, Ford and Packard plants. This, however, is a normal condition, as the occasions have been rare in the history of these three companies when expansion of some sort was not in progress.

Another firm which is adding materially to its facilities is the Poss Motor Truck Company. This is by means of a change of base, however. Up to date the Poss has been manufacturing in the old Anhut plant on Abbott street. The company has now purchased the plant formerly known as Brush Runabout No. 2, at Euclid avenue and the Grank Trunk tracks, in the northern part of the city. Considerably more room is thus placed at the command of the company, which is understood to be very well backed financially and has been manufacturing on an increased scale of late.

La France Aerial Truck Tested

ELMIRA, N. Y., July 2—Fire Chief E. H. Price of the Flint, Mich., fire department, accompanied by B. Brumph, C. R. Matt, L. D. Lane, George Norwood, Charles Willis, and Thomas R. Johnson, of Chicago, district sales manager of the American-LaFrance Fire Engine Company of this city, witnessed here last Friday a demonstration of the first motorized aerial fire truck made by the local concern. This truck was made for Elizabeth, N. J., fire department and has attracted widespread attention. Flint, Mich., wants one, and the test given the truck proved highly successful. The aerial truck has a wheelbase of 340 inches and the driving apparatus is applied to every wheel of the machine. The gasoline motor is connected with a generator which in turn generates power which is applied through flexible cables to each wheel, which is steerable. This enables the apparatus to carry a huge extension ladder raised by its own power.

The Elmira motorized fire department, including an American-LaFrance Company's motor driven service cart and combination service truck, motor driven, with an extension, spring raised ladder, gave an exhibition run last week, when the Knights Templar convened here, which was highly satisfactory. An alarm of fire was turned in and the motor apparatus responded speedily.

Los Angeles Christens New Car

LOS ANGELES, June 29—"I christen thee 'Perfex' and welcome thee and thy builders into the fold of the many industrial institutions that now grace our fair southland." With these words, H. B. Gurley, assistant secretary of the Los Angeles Chamber of Commerce, broke a bottle of Owens River water over the radiator of the newest automobile to make its advent into Southern California.

The new car is built in Los Angeles and therefore the welcoming ceremonies. The machine was designed and built by James Fouch in his new plant in Los Angeles. Several wealthy Easterners are interested in the Perfex Company, among them Paul Brown, a broker and member of the New York Stock Exchange.

Tire Exports Increase $500,000

WASHINGTON, D. C., June 29—The exports of motor car tires in May last were valued at $272,346, as against a value of $310,346 in June a year ago. However, during the 11 months' period ended May the exports increased in value from $1,838,482 in 1911 to $2,335,920 in 1912.

The imports of India rubber in May last amounted to 9,802,830 pounds, valued at $8,918,506, as against 6,399,946 pounds, valued at $6,340,948 imported in May a year ago. The imports for the 11 months' period increased from 65,723,492 pounds, valued at $70,736,522 in 1911 to 103,395,020 pounds, valued at $87,570,396 in 1912.

De Lisser Goes Back to Tires

Announcement was made Friday that Horace De Lisser has resigned as vice-president of the United States Motor Company, to take up the chairmanship of the board of directors of the Ajax-Grieb Rubber Company, makers of Ajax tires. Mr. De Lisser had been with the United States Motor Company since its organization, leaving the tire business to join with Benjamin Briscoe in that enterprise.

The Ajax company now plans the establishment of a tire factory abroad which will produce tires for Europe and parts of the world not easily served from the factory at Trenton, N. J.

Mr. De Lisser will leave for Europe on the Kaiser Wilhelm der Grosse, on July 30, to be gone six or eight weeks.

Carter Corporation Plant Sold

WASHINGTON, D. C., June 29—The plant of the Carter Motor Car Corporation, at Hyattsville, Md., was sold at auction this week and was bid in for $12,000 by P. M. Galvin, acting for the Independence Motor Company. It is understood this action was taken to protect the stockholders of the defunct corporation. It is planned to organize a new directorate of the Independence Company and resume operations.

June's Big Motor Incorporations

Automobile incorporations formed during June and having a capitalization of $1,000,000 or more are as follows: Delaware—Amplex Motor Car Company, $1,000,000; Rutenber Mo-

tor Company, $1,350,000. Maine: Edwards Motor Car Company, $2,000,000. Total, $4,350,000.

Among the manufacturers of automobiles and accessories and sales organizations connected with the trade the following incorporations of $100,000 or more have been filed during the month: New York: Brooks Motor Car Company, $100,000; Knickerbocker Commercial Vehicle Company, $300,000; Robert Stock Auto Spring Tire Company, $300,000; Resilient Punctureless Tire Company, $100,000, and the Weitch Motor Manufacturing Company, $200,000. New Jersey: National Automobile Sales Company, $300,000; Newark Auto Truck Manufacturing Company, $500,000. Massachusetts: V-C Motor Truck Company, $100,000, and Westfield Motor Truck Company, $100,000. Illinois: Cotta Gear Manufacturing Company, $100,000. Ohio: Ideal Commercial Car Company, $200,000. Indiana: Nelson Motors Company, $200,000. West Virginia: Pitt Motor Truck Company, $200,000. Making a total of $2,700,000, or a grand total for the month of $7,050,000.

Denniston Plant Sold for $9,050

BUFFALO, N. Y., July 2—The hearing in the Denniston Company bankruptcy proceedings held here last week resulted in the sale of the company's property to Dr. Edward J. Meyer, 1312 Main Street, for $9,050. The bankruptcy petition indicates that liabilities amounted to $85,745.94, of which $60,385.38 were unsecured. Its assets were $99,636.27, stock being $5,089.43, machinery, $19,219.42, and open accounts $13,727.17. A final hearing in the company's affairs has been set for Wednesday, July 10.

Citizens Want Gift Plant Returned

SHELBYVILLE, IND., July 1—An effort to take back the land and factory occupied by the Clark Motor Car Company has been started by the Citizens' Industrial Association, which about 2 years ago turned the land and plant over to the company. The association has brought suit to foreclose a mortgage and for liquidated damages, asking $26,000 on the ground that the company has not complied with an agreement to employ 150 persons for a period of 5 years, beginning 90 days after the company began operations. Involuntary bankruptcy proceedings were brought against the company some time ago and the plant was recently reopened after having been closed since February. The involuntary bankruptcy proceedings were settled.

Cole Selling Organization Complete

INDIANAPOLIS, IND., July 1—The Cole Motor Car Company starts today to handle its own sales. According to previous announcement, the Henderson Motor Sales Company, which has handled the marketing of the Cole and allied lines, was absorbed by the manufacturing company. The move is progressive, indicating that the time has now been reached when the factory management believe the line is sufficiently developed to allow it to combine the sales with the manufacturing departments.

Kissel Starts on Its 1913 Cars

HARTFORD, WIS., July 1—The Kissel Motor Car Company has started on its 1913 production after a shut-down of 10 days, during which period inventory was taken, the big plant overhauled and new equipment placed. Work will be started during the next month on a new factory building to supplement two large structures erected during the spring of the year. The average number of employees during the 1911-12 season was in excess of 1,100 and with new buildings and facilities, the pay roll for next season will exceed 1,500. Announcement of the new models will be made within a few weeks. It is stated that no radical changes from the existing Kissel practice will be made in the 1913 cars.

Republic's Capital Boost

Will Increase Stock from $6,000,000 to $10,000,000—Speedwell Planning a New Six-Cylinder Car

Corbin Screw Corporation to Make Speedometers—Lion Company Will Accept Adrian's Offer

YOUNGSTOWN, O., June 30—The directors of Republic Rubber Company on Thursday authorized the calling of a stockholders' meeting to be held early in August for the purpose of increasing the authorized capital of the company from $4,000,000 to $10,000,000. The capital will consist, after the increase, of $6,000,000 common and $4,000,000 preferred stock.

No definite announcement has been made as to amount of the additional capital to be issued this year. It is understood, however, that the steady growth of the company's business will require new capital before another season.

The directors have also authorized the construction of a large modern reclaiming plant, which with the completion of the five-story building now under construction will give considerably greater capacity.

It has been reported that there will be a common stock dividend of some size after the increase of capital has been provided for; but when interviewed President Thomas L. Robinson said no action had been taken in regard to the stock dividend.

Speedwell Planning New Six

Numerous changes and improvements will mark the 1913 line of Speedwell pleasure cars. While no detailed announcement has been made by the Speedwell Motor Car Company, it is pretty definitely understood that the models will include both fours and sixes and that the wheelbase will be materially lengthened.

The working force at the plant is to be increased, according to official word from the factory.

Corbin Enters Speedometer Field

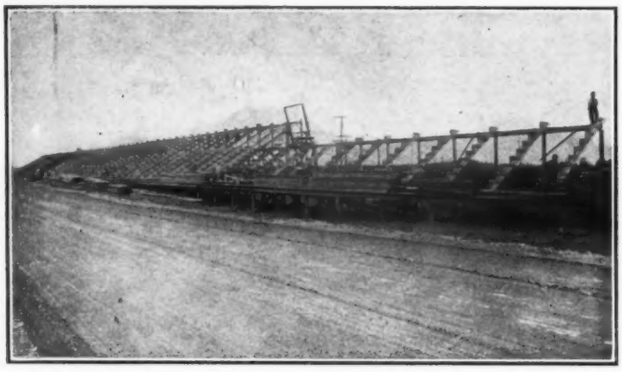
NEW BRITAIN, CONN., July 1—The Corbin Screw Corporation, division of the American Hardware Company of New Britain, Conn., announces that it will manufacture and market the Corbin-Brown Speedometer. The device has heretofore been known as the Brown Speedometer, but under the new name will embody a number of improvements. The Corbin-Brown Speedometer is the invention of Col. W. C. Brown of New York.

Estep Resigns from Packard

DETROIT, MICH., July 1—E. Ralph Estep, advertising manager of the Packard Motor Car Company, has resigned his position and is no longer connected with that company. Mr. Estep has had charge of the Packard advertising, except for two brief intervals, since the early years of the company. He is widely known as an editor and speaker. Mr. Estep's future plans are not announced. As yet there has been no successor appointed at the Packard plant.

Lion Company to Resume at Adrian

ADRIAN, MICH., July 1—Directors of the Lion Motor Car Company, which recently lost its plant here by fire, have decided at a meeting, held in Detroit, to accept the offer of this city of a complete factory building and will equip it as a motor car plant immediately. This plan will enable the Lion people to fulfil their contracts for orders of parts and supplies, already purchased for their 1913 line.



Grand stand at start and finish of Tacoma 5-mile course

Straightaway on Tacoma course before it was ironed out

Ready for Tacoma Races

Seventeen Entries for Two Big Events at 200 and 250 Miles Over 5-Mile Course

Corners Are Well Banked, and Prospects Are Excellent for Fast Time

TACOMA, WASH., June 28—Less than 2 months ago work was commenced on the 5-mile circuit just outside this city upon which the Montamara road races will be run next week. Something like $6,000 has been expended and a marvel has been wrought considering the small amount of time and money that have been available for the purpose. The course is in fine shape today practically throughout its entire length and several of the drivers who will take part in the races have made exceedingly fast time over parts of it.

Part of the course has been laid out over ordinary country highways but quite a material part of the circuit had to be constructed from the grass-roots down. Of course the existing roads that have been included in the course have been revolutionized and the result is to be seen in the broad, safe speedway that has been brought into being by the energy of the road builders.

Right up to the post call the engineers will continue to improve the course. The last of the oiling will be done on Monday but work will continue on the surface until Thursday night. Packers and steam-rollers will not be withdrawn, save for the time allowed for practice work, until sundown on Thursday.

It will take a year before such a course can reach its perfection, but there are many among the automobile enthusiasts here who predict that an average speed of over 70 miles an hour will be attained for the whole of the free-for-all contest. Tetzlaff has said that on the straightaways it is not unlikely that a maximum of 110 miles an hour will be reached by some of the cars.

The course is about 2 miles shorter than the Los Angeles Santa Monica circuit and the straightaways are correspondingly shorter. The turns have all been banked so that there is not one on the course which can not be taken with a fairly wide throttle. It is predicted that 60 miles an hour around any of them will be possible without untoward results.

Work on the grand stands is progressing to completion and accommodations for a vast army of spectators will be provided. The location of the course is just south of the city and can be reached by street car or via the Northern Pacific, which will inaugurate a special service from the center of the town to the grand stand on the race days.

The street car schedule has been extended 1 hour earlier than usual and frequent service will be provided after 5 o'clock in the morning.

Martial law will prevail on the course during both days of racing and the local companies of the National Guard will be on duty to prevent spectators from getting in the way of the racers and to maintain a careful patrol of the whole circuit.

The latest indications are that there will be about twenty entries in the races.

The field now lines up as follows for the two big road races of 200 and 250 miles each, run respectively on Friday and Saturday: 3 Fiats, 1 Benz, 3 Nationals, 2 Coles, 2 Stutz, 2 Mercers, 2 Simplex, 1 Pope, 1 Knox.

Two of the Fiats are 120 horsepower; the third is 70 horsepower; the Benz is 110 horsepower; the Stutz are 50 horsepower, and the others range from 30 to 90 horsepower.

There are still a number of soft and rough spots on the course that are centering the attention of the road makers and so far any supreme speed has not been essayed over it in its entirety. On the straightaways all the contestants have opened wide and several of them have made the whole round in fast time. However, the best mark set in practive to date is a little less than 4:56, which is slightly more than 60 miles an hour on the longest stretch of the circuit. Numerous rounds have been made in 5 minutes and thereabouts.

The fastest spurt indulged in by any of the entries was 1 mile in 41 seconds by the Cooper Stutz.

One reason why rounds have not been made at the 70-mile-an-hour rate is that there is a rough spot across the course 3-4 mile from the end of the best straightaway, necessitating much care and low speed. On this spot a steam-roller and a gang of tampers have been busy for 2 days past and during the practice today the drivers began to shoot their cars across at full speed. Just beyond the last turn before reaching the main stands there are two more bad spots which will be rolled out and resurfaced tomorrow.

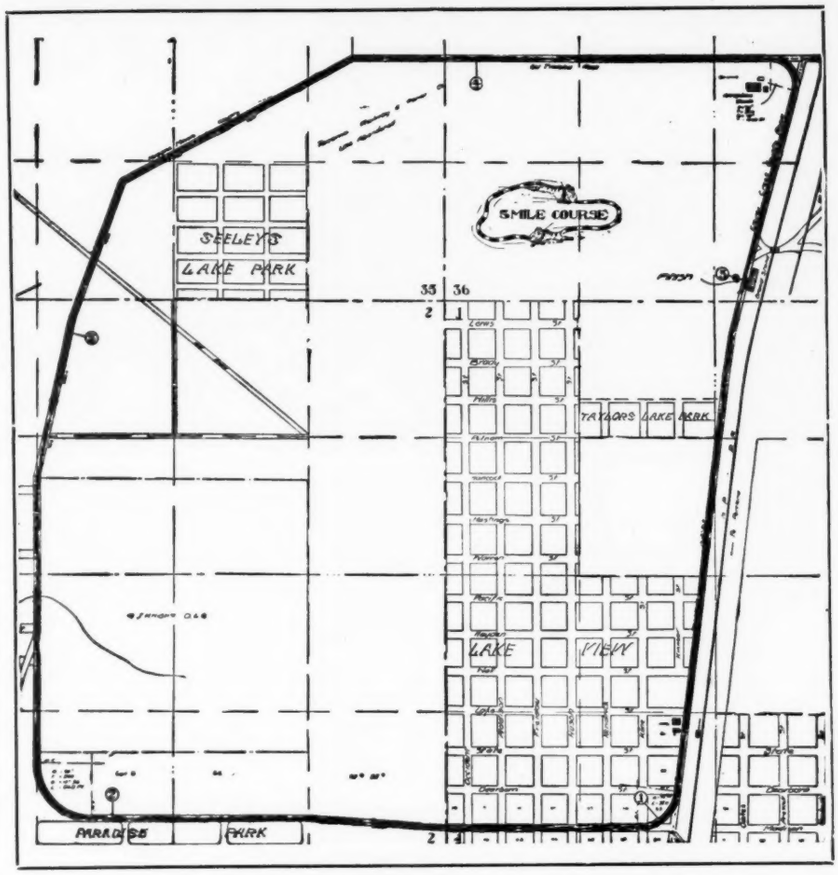
Broad banked turn, near Lakeview, before completion

The three chief corners on the course have turns constructed on a radius of 1,000 feet, which ought to be sufficiently gentle and safe to make the race comparatively free from mishaps. They have been banked according to the most approved formula, and if there should be any spills the management predicts that they will not occur on the turns.

The pits are located above the finishing line and within easy view of all but one of the stands. The seating capacity of the grandstands is well above 20,000, and the parking spaces are sufficiently commodious to take care of 2,500 automobiles.

The prizes offered to the winners are satisfactorily large. In the big free-for-all the money purse amounts to $5,000 and the total amount of prize money hung up is $10,000. These purses with the challenge trophies that they carry make the prize list formidable.

Special arrangements have been made at all the local hotels to take care of the crowds and low excursion rates to this city have been granted by the railroads. While the population within a radius of 50 miles is not up to metropolitan standards and ideas, the territory included is rich from every material viewpoint and its residents are prosperous. In one of the small valleys near Olympia, which is devoted to fruit culture, it is claimed that there are more automobiles owned per capita of population than in any similar sized locality in the world.



Map of the Montamara 5-mile course, near Tacoma, Wash.

Small Crowds at Washington's 2-Day Meet

WASHINGTON, D. C., June 29—Designed to afford some amusement for the big crowds attending the Democratic Convention in Baltimore this week, a 2 days' race meet began on the mile dirt track at Laurel yesterday. The convention was too attractive, however, and less than three hundred people attended the first day. Burman won back the Remy brassard in his Blitzen Benz, covering 3 miles in 3:20. He had little competition, as only Elmer MacDonald, in the Benz 110, and I. C. Barber, a local driver, in a Warren-Detroit, opposed him. They finished in the order namer. Burman won the 21-mile race in 27:32, with Raimey's Ohio 99 second and French's Lozier third. The summaries:

Non-stock, 161 to 230 cubic inches, 5 miles

No.	Car	Driver	Time
1.	Warren-Detroit	I. C. Barber	6:15
2.	Reo	Frank Stewart	

Non-stock, 231 to 300 cubic inches, 5 miles

1.	Ohio	John Raimey	5:37
2.	Kline	C. C. Fairman	
3.	Mercer	Frank Blair	

First heat for Remy Brassard, 3 miles

1.	Blitzen Benz	R. Burman	3:20
2.	Benz 110	E. MacDonald	
3.	Warren-Detroit	I. C. Barber	

Non-stock, 600 cubic inches and less, 5 miles

1.	Cutting	R. Burman	5:22
2.	Kline	I. W. Minker	
3.	Lozier	H. W. French	

Exhibition Mile

Blitzen-Benz	R. Burman	:58 3-4

Non-stock, 600 cubic inches and less, 25 miles

1.	Cutting	R. Burman	27:32
2.	Ohio	J. Raimey	
3.	Lozier	H. W. French	

Free-for-all, 5 miles

1.	Benz	E. MacDonald	4:12 1-2
2.	Kline	C. C. Fairman	
3.	Lozier	H. W. French	

The second day's racing brought out the same fields as the day before. The crowd was very small and the promoters will lose a great deal of money on the venture. The results:

5-mile race

Car	Driver	Time
Mercer	Frank Blair	6:04
Warren	I. C. Barber	
Reo	F. Stewart	

Second heat for Remy Brassard, 3 miles

Benz	E. MacDonald	5:11 1-4
Benz	R. Burman	

Third heat for Remy Brassard, 3 miles

Benz	R. Burman	3:06 1-2
Benz	E. MacDonald	

5-mile race

Cutting	R. Burman	5:34
Ohio	J. Raimey	
Warren	I. C. Barber	

5-mile race

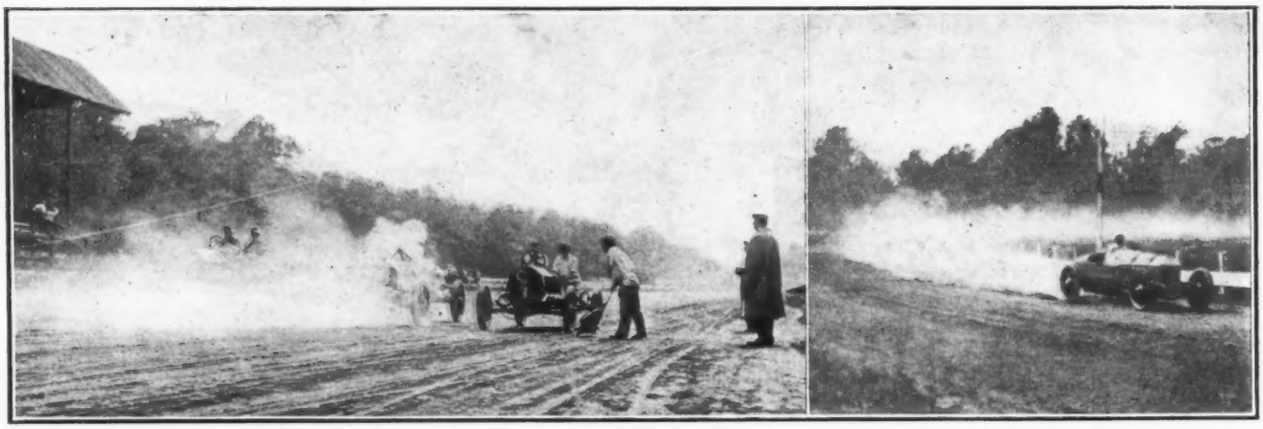
Ohio	J. Raimey	5:55
Warren	I. C. Barber	
Mercer	Frank Blair	

Free-for-all handicap, 5 miles

Benz	E. McDonald (Scratch)	6:05 1-2
Warren	I. C. Barber	
National	C. Campbell	

Australian pursuit race

Benz	R. Burman (8 1-2 miles)	8:19 1-4
National	C. Campbell	



Start of Event 1, won by Buick. Menker in Klinekar passing Blocksom in Stutz in 10-mile race

Klinekar Stars at Belmont

Wins Free-for-All and 10-Mile Events —Morton's Mercer Overturned; Nobody Hurt

Three Unsuccessful Attempts to Lower Burman's Mile Track Record of 54.26

PHILADELPHIA, June 29—All things considered, the initial race meet of the Belmont Motor Club held this afternoon at the Belmont Driving Park, Narberth, was an ambitious attempt, and the disappointingly small crowd that attended was amply repaid for any discomfort due to the sweltering heat of the hottest day so far this summer by the exciting finishes in several of the events. To further add to the excitement an accident occurred which at first was thought to have had a serious termination. The accident occurred during the running of the sixth event, a 50-mile free-for-all race with an entry list of ten, only four of which, however, faced the starter. These were a Stutz, driven by S. R. Blocksom; a Mercer, driven by W. D. Morton; a Fiat, piloted by William Frietag, and a Klinekar, John Menker, driver. Early in the contest the Fiat was forced to drop out, and the three survivors put up the prettiest contest of the day. On the seventeenth lap the Mercer entry crashed into the fence on the far side of the track, throwing both driver and mechanician out. The spectators crowded on the track and threatened further danger, as the Stutz and the Klinekar were still tearing around the oval. The race was immediately stopped. The Mercer car was put out of commission but neither W. D. Morton nor his mechanician was seriously injured. The contest was resumed between the Stutz and Klinekar on the eighteenth lap, at which point the former car held a commanding lead. A succession of tire troubles toward the conclusion of the race, however, caused the Stutz to lose much valuable time, which the Klinekar was not slow to take advantage of, and when two flat tires, one in the forty-seventh and the other in the forty-ninth lap occurred, the Klinekar breezed in a winner by a comfortable margin. The latter car was not without its tire troubles either, but they occurred less frequently.

In the 1-mile exhibition for the track record, although three attempts were made, Burman's 54.26 seconds still stands, the nearest approach to it being made by John Menken in a Klinekar, who negotiated the mile in 58 seconds flat, which, by the way, was the fastest lap of the afternoon.

The program was marred somewhat by the withdrawal of several of the entries, so that with one exception the fields were small. By the application of liberal quantities of calcium chloride, assisted by an autocar sprinkling wagon that made trips around the track during intermissions between events, the raising of dust was reduced to a minimum.

Event No. 7, a 10-mile handicap race, furnished plenty of thrills, William Frietag in his Fiat, starting from scratch, wearing down his six opponents one by one, winning in 10 minutes 50 seconds, the Empire car, driven by R. D. Smith, Jr., finishing second.

Event No. 3, 10 miles, was featured by the establishment of a record for cars of 301 to 450 cubic inches piston displacement. the Klinekar driven by John Menker covering the ten laps in 9 minutes 55 seconds, although the record will not be official owing to there being no timing device to record it, as required by the A. A. A. The summaries:

Non-stock; 5 miles; 161 to 230 cubic inches

No.	Car	Driver	Time
9	Buick	Eddie Bauer	6:02⅘
18	Cartercar	H. Baker	6:03⅘
12	Empire	R. D. Smith	....

Non-stock; 5 miles; 231 to 300 cubic inches

14	Bergdoll	E. Homan	6:00⅘
3	Mercer	W. D. Morton	....
4	Mercer	Harvey Ringler	....
1	Klinekar	C. C. Farman	....
7	Schacht	Jas. M. Gray	....

Non-stock; 10 miles; 301 to 450 cubic inches

2	Klinekar	John Menker	9:55
28	Stutz	S. R. Blocksom	5;56⅘
17	G. J. G.	Al Millichap	....

1-mile exhibition to lower track record of 54.26 seconds

Fiat	William Frietag	1:01
Klinekar	John Menker	:58
Chadwick	Willie Haupt	1:02

Free-for-all; 50 miles

1	Klinekar	John Menker	53:39
28	Stutz	S. R. Blocksom	....

10-mile handicap

12	Empire	Wm. Frietag	10:50
15	Fiat	R. D. Smith, Jr.	....
7	Schacht	Jas. M. Gray	....

Handicap for non-winners of previous events; 5 miles

12	Empire	R. D. Smith, Jr.	5:39
7	Schacht	Jas. M. Gray	....
4	Mercer	Harvey Ringler	....

Hoosiers to Honor Speedway Builders

INDIANAPOLIS, IND., July 1—The business interests of the city will pay a pleasing tribute to Carl G. Fisher, A. C. Newby, F. H. Wheeler and James A. Allison, owners of the Indianapolis Motor Speedway, when they give a dinner at the German House to-morrow evening. The dinner is to be in recognition of the services of the owners of the speedway to their home city and will be one of the first honors of the kind ever paid to an Indianapolis citizen.

There will be about 100 guests, representing the substantial business interests of the community.

Mr. Fisher and Mr. Allison have recently begun the construc-

tion of Speedway, the first horseless city in the world. They are also owners of the Prest-O-Lite Company, and Mr. Fisher is the Indiana agent for the Packard and Stutz. Arthur C. Newby is secretary and treasurer of the National Motor Vehicle Company, while Mr. Wheeler is a member of Wheeler & Schebler, carbureter manufacturers, and of the Langenshamp-Wheeler Brass Works.

Unclaimed Prizes Distributed

INDIANAPOLIS, IND., July 1—The Indianapolis Motor Speedway Company has divided $2,100, representing the eleventh and twelfth prizes in the 500-mile race Memorial Day, among the drivers who were unable to finish on account of accidents. As only ten cars finished, the two last prizes were not claimed. The $2,100 has been distributed on a basis of the number of laps covered by each driver. It was found that the fourteen cars failing to finish covered 1,093 laps, which gave a basis of $1.9213 a lap for each of the fourteen drivers.

Distribution of the $2,100 has been as follows: Stutz, Anderson, 80 laps, $153.70; Mercedes, De Palma, 199 laps, $382.34; Case, Disbrow, 67 laps, $128.73; Case, Herrick 54 laps, $103.75; Mercedes, Wishart, 92 laps, $176.76; Lexington, Knight, 7 laps, $13.46; Simplex, Dingley, 116 laps, $222.87; Cutting, Burman, 157 laps, $301.54; Firestone-Columbus, Rickenbacher, 43 laps, $82.62; Marquette-Buick, Liesaw, 72 laps, $138.34; McFarlan, Marquette, 63 laps, $121.04; Opel, Ormsby, 7 laps, $13.46; Lozier, Matson, 110 laps, $211.34, and National, Bruce-Brown, 26 laps. $49.95.

Davenport's Gala Motor Fourth

DAVENPORT, IA., July 1—Davenport automobilists are to have a special gala day July 4, the annual hill climb of the Davenport Automobile Club and the speed demonstrations of Bob Burman at the mile track in the afternoon to be the features. The hill climb will be held on Rock Island street, from Third to Tenth street. Two blocks are to be allowed for a flying start, the machines to be timed on five blocks. The record for the distance is 17 4-5 seconds, made by Pete Petersen of the P. C. Petersen Auto Company in a Pope-Hartford last year.

Ford Enjoins Price Cutters

DAYTON, O., July 2—The United States District Court at Cincinnati has decided in favor of the Ford Motor Company in its suit against the Union Motor Sales Company, of this city, in which unfair competition and violation of certain patent rights belonging to the complainant company were involved. The ruling of the court orders a temporary injunction. In the suit it was charged that the Union Sales Company advertised Ford automobiles at less than list price and the manufacturing company proceeded against the Dayton concern.

Run to Wildwood Races

Many Quaker City Motorists Will Tour To Seaside Resort to See Straightaway Contests

Thirteen Prizes Will Be Hung Up for the Roadability Event—Good Fields for the Races

PHILADELPHIA, June 29—The roadability run under the auspices of the combined Boards of Trade of Wildwood, North Wildwood and Wildwood Crest from Philadelphia to Wildwood, N. J., next Wednesday morning, culminating in a race meet in the latter resort on Independence Day, promises to be one of the largest and most successful of its kind yet attempted. Taking part in the run down as non-contestants will be a score or more of racing cars that will take part in the contests to be waged on Thursday.

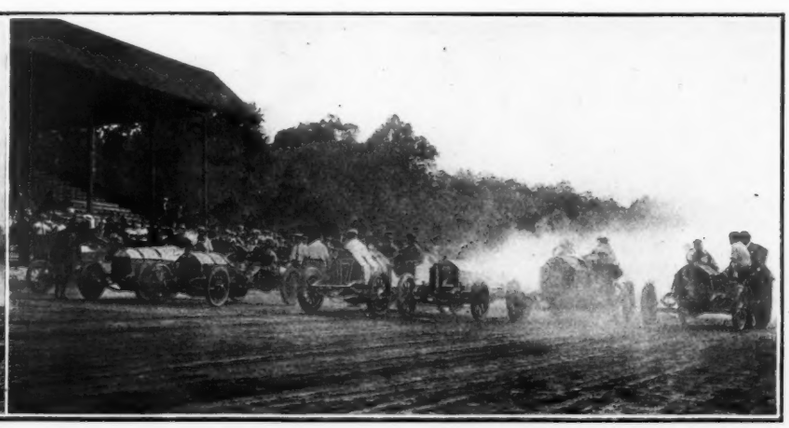
The itinerary as mapped out by the pathfinding Stoddard-Dayton Saybrooke car includes Gloucester, Westville, Woodbury, Swedesboro. At the latter town the tourists will be joined by a contingent of local machines, to whom two cups, the Ford Hotel Cup and the Clark Hotel Cup, will be awarded the cars running nearest the legal speed limit from Swedesboro to Wildwood, N. J. From Swedesboro the tourists will touch Alloway, Salem, Bridgeton, Millville, Port Elizabeth, Dorchester, Leesburg, Cape May Court House, thence into Wildwood.

In addition to the two special cups for Swedesboro contestants only, eleven others will be awarded, including two for the women's division, four main prizes and five supplementary ones. To the car finishing nearest the secret time for the full distance, which will be set by J. Thompson Baker, mayor of Wildwood, the prize is $50 in gold; second nearest, the Hotel Ridgway Cup, Camden, N. J.; third, Colonial Hotel Cup, Wildwood, N. J.; fourth, Hutchison Motor Company Cup, Woodbury, N. J.

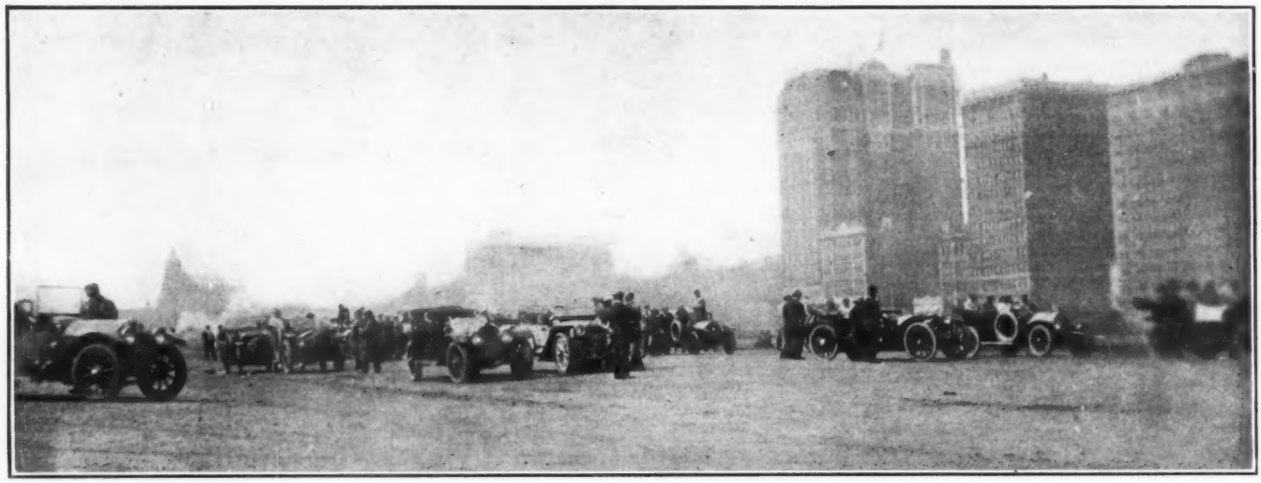
For the secret intermediate control feature of the run, to the car nearest the legal speed limit at the first control (Alloway, N. J.) will be presented the Alloway Hotel Cup; second control (Salem, N. J.), the Nelson House Cup; third control (Bridgeton, N. J.), the Bridgeton Cup; fourth control (Wildwood, N. J.), the Ruric Hotel Cup.

A majority prize of $50 in gold is also hung up for the greatest number of cars of any one make entered in the run by a Philadelphia agent and, finally, two special prizes, one a sterling silver chatelaine bag and the other a sterling silver chatelaine wrist watch, will go to women contestants. The automobile races on July 4th will all be one-mile straightaway.

Stutz passing Klinekar in 50-mile race.



Start of 10-mile handicap, won by Fiat



Start of the fifth annual reliability team match between the Chicago Athletic Association and the Chicago Automobile Club

Athletes Beat Motorists

Chicago Athletic Association Team Wins from Automobile Club in Annual Roadability Event

Heavy Penalties for Two of the Latter Team Upset Good Work of Their Mates

CHICAGO, June 29—The fifth annual interclub reliability team match between the Chicago Athletic Association and the Chicago Automobile Club, which was run Thursday and Friday of this week to Milwaukee and return, was won by the former club by the closest margin that ever has marked a match between the two organizations, the Cherry Circle having 46.7 points against it and the Chicago Automobile Club 58.

This is the great amateur event of the year, no one identified with the trade being permitted to participate as contestants. Because of the political conventions the entry list was not as large as was expected, there being at least a dozen scratches because of this. Still, the C. A. A. had twelve cars in line and the C. A. C. eleven.

The contest was run under grade 3 of the A. A. A. rules, penalizations being only for work done on the road and for being late at controls. This produced an interesting contest and the result is a demonstration of the skill of the amateur drivers, for of the twenty-three contesting fifteen made perfect scores. It was hard luck for the Chicago Automobile Club to lose, for only two of its drivers were penalized, while the second day the entire team went clean. At the end of the first day's run the Cherry Circle looked an easy winner with only 2 points against it, but yesterday, coming back from Milwaukee, S. F. Weatherly, in a Pathfinder ran into a ditch near Libertyville, sinking to the hubs. He had a couple of motor stops charged against him and also had to clean out his carbureter feed line with an air bottle, the line having become clogged because of the mud. All this work gave him 43 points which brought the C. A. A. near defeat.

A fine stretch of road near Lake Geneva

The other five cars penalized on the C. A. A. side got their black marks for trifling causes. Frank Wentworth in a Rambler drew 4 points because his lighting system shortcircuited his ignition. The other four were charged with motor stops.

The first day's run was to Milwaukee, the mileage being 137, while the route back yesterday was but 120 miles. While at the night stop the Chicagoans were entertained by the Milwaukee Automobile Club at its country home.

TABLE SHOWING PENALIZATIONS IN THE INTERCLUB-RELIABILITY MATCH RUN BETWEEN THE CHICAGO ATHLETIC AND AUTOMOBILE CLUBS

CHICAGO ATHLETIC ASSOCIATION

No.	Driver	Car	Penalty 1st day	Penalty 2nd day
1.	C. T. Knisely	Diamond T	0	0
3.	Frank Wentworth	Rambler	0	4
5.	W. F. Grower	Diamond T	1	0
7.	W. C. Thorne	American Traveler	0	1
11.	A. H. Gunther	Cadillac	1	0
13.	C. A. Briggs	Chalmers	0	0
15.	W. Chamberlan	Rambler	0	0
21.	S. F. Weatherly	Pathfinder	0	43
23.	Harry Boulter	Locomobile	0	0
25.	W. Simpson	Winton	0	1
27.	L. Jacques	Peerless	0	0
29.	S. E. Hibben	Packard	0	0
			2	49

CHICAGO AUTOMOBILE CLUB

No.	Driver	Car	Penalty 1st day	Penalty 2nd day
2.	Allen S. Ray	Stearns	0	0
4.	C. F. Ballou	Apperson	0	0
6.	Charles Bosch	Stearns	25	0
8.	J. T. Brown	Velie	0	0
14.	R. O. Evans	Apperson	0	0
16.	H. A. Ford	Premier	0	0
18.	E. T. Franklin	Abbott-Detroit	33	0
20.	G. F. Griffin	Peerless	0	0
22.	W. M. Jones	Winton	0	0
24.	F. E. Mann	Locomobile	0	0
28.	R. B. Wilson	Knox	0	0
			58	0

Advertised Cars as Stock

Agencies Suspended for Misleading Statements Regarding Victories at Indianapolis and Elsewhere

Referee and Promoter Disciplined for Disregarding Contest Board Ruling—Records Granted

FOR breaking the rule about advertising the performances of contestants in non-stock events as being those of stock cars, three automobile agencies fell under the ban of the American Automobile Association at its meeting last week. The disciplined agencies are as follows: The Wisconsin Auto Sales Company of Milwaukee and the Howard Automobile Company of San Francisco were suspended until January 1, 1913, for advertising the performance of the winning National in the recent 500-mile race at Indianapolis as a stock car victory. The Empire Motor Car Agency of Boston was given a similar sentence for claiming that a Stutz car that competed in a race at Salem, N. H., was a stock car running under non-stock conditions.

On a dusty piece of road near Mucknowago

E. G. Kuster, official representative of the A. A. A.; R. P. Hillman, referee of recent California contests, and A. M. Young, promoter of the Santa Monica road races and other events, were disciplined. Mr. Kuster's resignation was accepted and Mr. Hillman was declared ineligible as an official until January 1, 1913, and Mr. Young was barred for a similar period.

The matter in question was the disregarding of a telegraphed ruling of the Contest Board defining the status of the E-M-F—Flanders entries.

In order to cover the point more definitely than it is in the present rules the following amendment, effective August 1, has been adopted:

"No car with a bore, stroke and piston displacement of a different size from the regularly catalogued product of a manufacturer shall be entered in any sanctioned event until its manufacturer shall have filed with the Contest Board, on official blanks provided for the purpose by the Contest Board, sworn certificates giving the bore, stroke, number of cylinders, total piston displacement, horsepower and year and model name of the cars, and such cars must be officially entered, programmed and advertised in strict accordance with such registration.

"All other cars must be entered, programmed and advertised in strict accordance with catalogued specifications.

"Rule 113 (on Road Racing). REPAIR PITS. There shall be located at the start and finish line one repair pit for each car started, not less than 15 feet long and 8 feet wide. The pits must be located on the right of the course in the direction in which cars are traveling. If located on the same side and in front of the grandstand, there must be an intervening distance of not less than 15 feet between the pits and the stand."

The following official records made at the recent Indianapolis race were allowed:

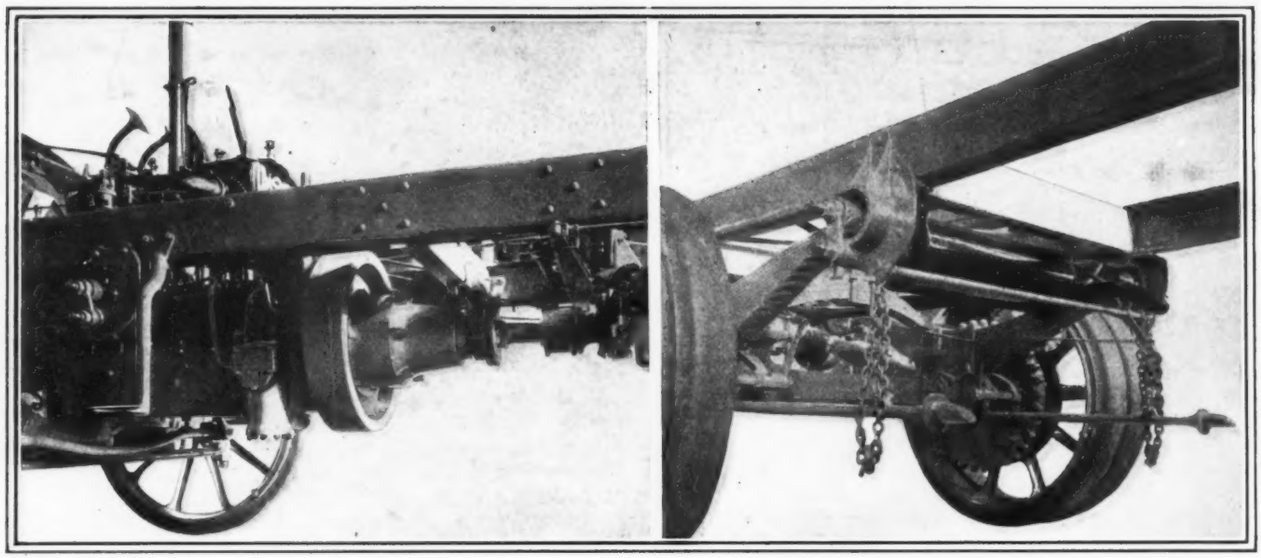
Distance, Miles	Car	Driver	Time
100	Fiat	Tetzlaff	1:13:37.25
150	Fiat	Tetzlaff	1:49:52.84
200	Fiat	Tetzlaff	2:25:59.52
250	Fiat	Tetzlaff	3:07:13.94
300	National	Dawson	3:48:49.30
350	National	Dawson	4:25:15.27
400	National	Dawson	5:04:14.23
450	National	Dawson	5:44:04.54
500	National	Dawson	6:21:06.03

(NOTE.—The time of the No. 4 Mercedes, driven by DePalma, bettered all of the above times, with the exception of the 500-mile mark, but under Rule 79 of the 1912 Contest Rules no record at an intermediate distance is allowable unless the car finishes the event. The No. 4 Mercedes discontinued the race in the 199th lap.)

Alco Truck Is Nearing Omaha

MARSHALLTOWN, IA., July 2—The transcontinental trip of the Alco 3-ton has proved successful so far and the car is now approaching the mid-way point, having averaged 12 miles an hour during its running time to date. The car is delivering 3 tons of freight to a Pacific coast consignee. The first half of the trip was routed over good roads and the car still has to face the rough going of the Rocky Mountains and the desert country.

Start from Milwaukee of the team match reliability run between the Chicago Athletic Association and the Chicago Automobile Club



Partial view of chassis, showing arrangement of clutch and motor. Rear view of chassis, showing construction features

Locomobile 5-Ton Truck

Motor Develops 45 Horsepower and All Parts of the Machine Are Especially Designed for Commercial Work

Increased Factors of Safety, Increased Bearing Areas and Decreased Pressures and Strains Important Features

AFTER investigating conditions in the commercial vehicle field for a number of years, studying the design, materials and construction most suitable for such work and testing out an experimental machine, the Locomobile Company, Bridgeport, Conn., has brought out a 5-ton truck. The main features of the experimental machine have been retained but improvements have been made wherever the tests demonstrated their feasibility.

The design of the truck shows a very compact arrangement, affording a very large platform space, and at the same time making the vehicle one which is easily managed, only a 27 1-2-foot radius being needed to make a complete turn.

The driver's seat is located over the motor, thus affording the maximum platform space and carrying capacity for the wheelbase, and enabling the operator to handle the truck more easily.

Parts Built for Hard Service

In the production of this truck no parts have been used which were designed for any of the types of pleasure cars that the company has constructed. Every part has been designed for the truck, so that it will be able to withstand the more severe duty to which trucks are subjected.

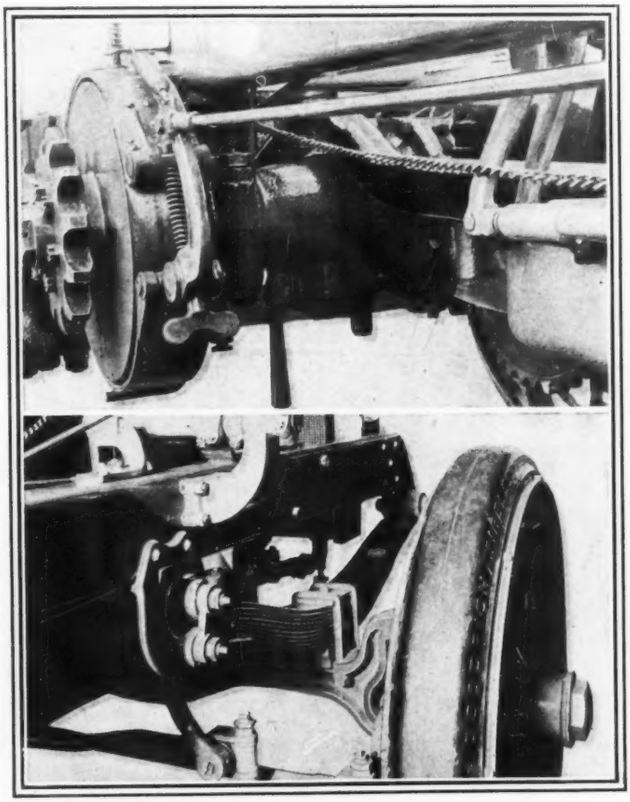
The general dimensions of the truck are as follows: Wheelbase, 140 inches; tread, front, 65 inches; rear, 70 inches. Height above ground, loaded: frame, 39 1-2 inches; platform, 46 inches; driver's seat, 72 inches. Platform length, 14 feet; width, 6 feet (or wider). Width over hub caps, 85 3-4 inches. Length over all, 226 1-4 inches.

A self-contained, continuous-flow lubricating system, which has proven very economical, has the added advantage that its regulation cannot be altered by the operator, and a specially designed ring governor, which prevents the motor speed from exceeding 900 r.p.m., has been added.

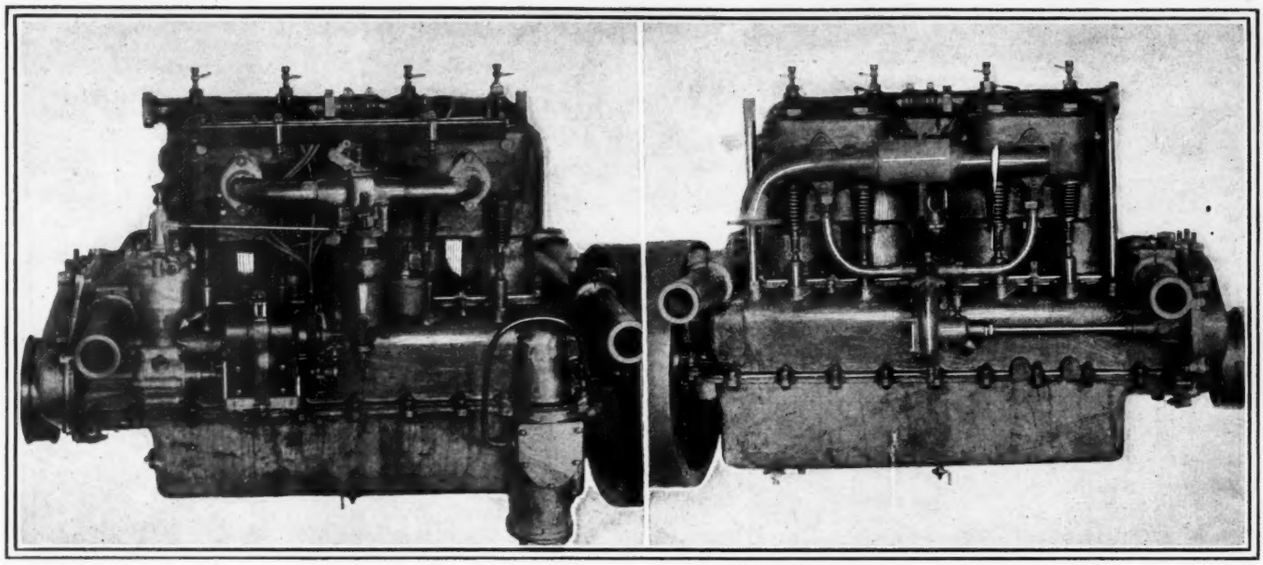
The water outlet pipes, instead of being made separately, are cast integral with the cylinder waterjacket caps, to eliminate the danger of leaky joints.

The double chain drive gives great strength, flexibility and the maximum tractive effort. The motor is of the four-cylinder, water-cooled type, having a bore of 5 inches and a stroke of 6 inches, and developing 45 horsepower at 900 R.P.M., and was made especially for truck service.

The diameters of the valves have been increased, as well as those of the admission and exhaust pipes, thus reducing gas velocities; and the valve stem guides, instead of being cast integral with the cylinders, as is the usual practice, are cast separately and forced into place so they can be easily replaced.



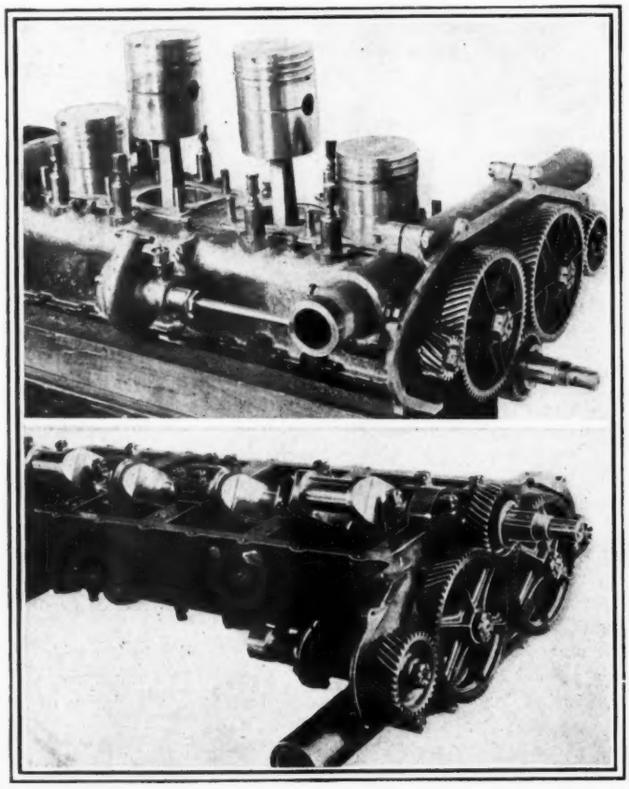
Arrangement of brake and drive sprocket on the jackshaft
Front suspension, one shackle bolted on, the other welded



Intake side of Locomobile 5-ton truck motor, showing governor. Exhaust side of motor, showing independent water pump shaft

The exhaust manifold is made in two parts, one of which telescopes inside the other, thus obviating any stresses between the two pair of cylinders due to the longitudinal expansion of a solid manifold when heated, which would tend to throw the wristpin and crankpin bearings out of proper alignment.

Radical changes have been made in the method of supporting the crankshaft, and in the size of the crank and connecting-rod bearings, so that the pressures per square inch of projected bearing area could be cut down to the minimum. Instead of a three-bearing crankshaft with bearings 1¾ inches in diameter, such as was used in the pleasure and public service cars, a five-bearing crankshaft, with bearings 2¼ inches in diameter, is used on the truck. In consequence, the crankshaft bearings in the truck have a projected area of 41.34 square inches, as against the projected bearing area of 21.54 square inches on the pleasure and public service cars. This tends to increase the life of the bearings and to minimize motor troubles. The crankpin and wristpin bearings also show a marked advance in size over previous practice.



Cylinders removed, showing engine pistons and connecting rods
Top of crankcase removed, showing crankshaft and timing gears

The connecting-rods are of I-beam section, drop forged from a steel strong enough to give the rods a factor of safety of 25.

The crankpin bearing caps are held in place by four studs to which they are fastened by means of a lock washer, plain nut, castellated lock nut and cotter pin.

The cast-iron cylinders are cast in pairs and have very large waterjackets. Each cylinder pair is fastened to the crankcase by means of six ⅝-inch studs, nuts and castellated lock nuts.

The cylinders, after being bored and reamed, are ground to a finish, as are also the pistons. The pistons are each fitted with four ¼-inch rings above the wristpin, each of which has been annealed to relieve it of all internal strain, and has been carefully ground and finished to an exact fit.

In the crankcase the makers have followed their standard practice by using bronze, thus insuring alignment of the crank bearings and eliminating any danger of crystallization under the road shocks to which a truck is subjected.

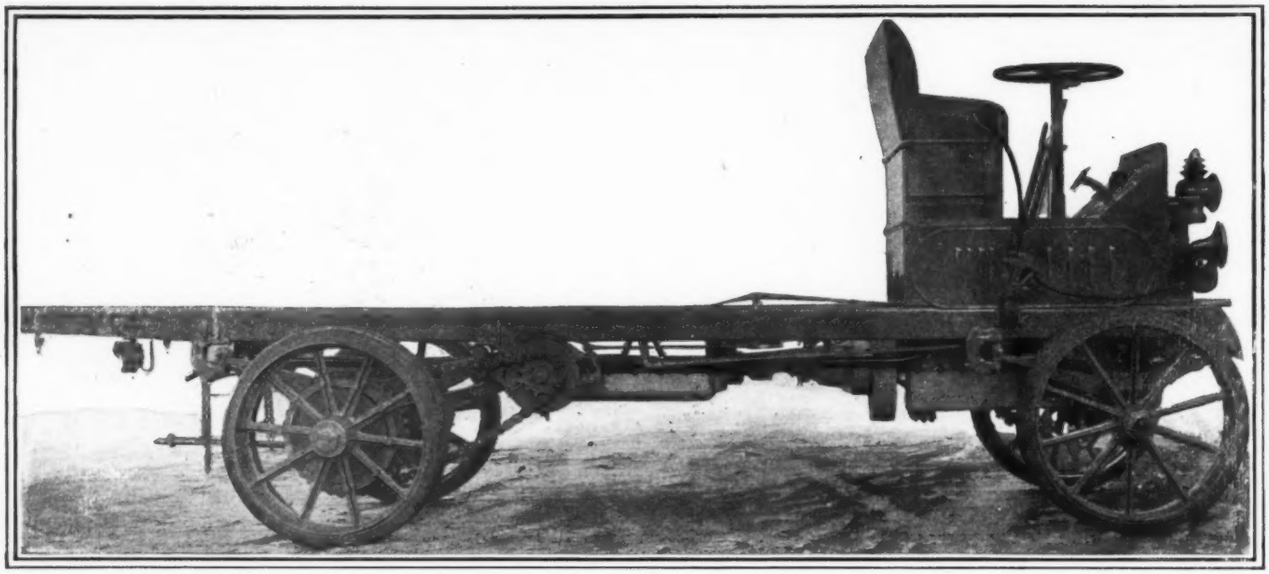
The crankcase is supported front and back from the channel side member of the frame in a manner which makes the motor easy to remove and insures alignment upon replacement.

Steel Tubes Support Motor

Two 3-inch steel tubes pass through holes bored in suitable lugs in the front and rear of the crankcase and are held firmly in position by means of clamp bolts, which draw together the slotted ends of the two bearings. Cast steel bearing brackets, bolted rigidly to the frame after the motor has been properly aligned, support the tubes and keep them in place by means of caps bolted down.

The governor, which is located on the left-hand side of the motor in front of the magneto, is of the vertical ring type, and is driven from the magneto driving shaft by spiral gears. The ring is hung from the shaft at a normal inclination to the horizontal plane of 53 degrees and carried by two cams. It is held in this position by a spring, but as the motor speed increases the tension of this spring is overcome, and the ring seeks to assume a horizontal position. The governor is connected by linkage to a butterfly valve in the carbureter, which remains wide open at all speeds below 900 r.p.m., at which speed the governor cuts off.

The carbureter is of standard Locomobile design. It is of the float-feed type and is fitted with both a hot air regulator and



Locomobile 5-ton truck with platform body; 70 per cent. of the load capacity is carried on the rear wheels

a hot water jacket. Only a single jet is used, which insures easy starting; but this single jet, owing to its design, performs the functions of both the single and multiple type jets. This is accomplished by elongating the jet so that the customary hole in the top is some distance above the level of the gasoline in the float chamber. Supplementary holes are drilled in the jet just above the gasoline level. Gasoline for low motor speeds is supplied through the supplementary openings, the necessary excess for high speed being furnished by the hole on top, the gasoline being drawn through it by the increased suction due to the higher velocity of the mixture through the vaporizing chamber. An air adjustment is arranged on the dash.

The water-cooling system contains 8 gallons of water. Instead of having a rigid return water connection on top of the cylinders, the cylinder water jacket caps have return pipes cast into them. The connection with each other and with the radiator is made with rubber hose connections, eliminating any danger of breakage due to vibration, and relieving the water jacket caps of all strain.

The radiator is protected by being set behind a large channel cross-member, and is hung in a novel manner.

A large aluminum fan, cast in one piece and driven by a 1¾-inch flat belt, is provided, the driving pulley being on the crankshaft. This fan is mounted on two ball bearings contained in an eccentric case, which, by loosening a nut, can be turned, thus adjusting the tension of the belt and facilitating any necessary belt replacements.

Clutch Alignment Is Assured

The dry disk clutch installed in this truck is self-contained and is carried on the flywheel alone, preventing any possibility of the plates getting out of alignment. Its connection with the transmission is through a drive shaft which has a universal action. The seven driving disks, which engage with six hardened and ground driving bolts attached to the clutch drum bolted to the flywheel, are made of ⅛-inch sheet steel. The seven driven disks, which are mounted on the clutch disk retainer, are made of ⅛-inch sheet steel and are lined on both sides with a non-burn material 5-32 inch thick. The driven members are provided with a clutch brake.

The transmission is of the electric type, with four speeds forward and a reverse. The transmission case proper, which is a manganese bronze casting having a tensile strength of 68,000 pounds per square inch, comprises the top, instead of the bottom, half of the transmission case, contrary to usual practice. The bronze top half is supported from the frame, and the clutch pinion, countershaft and mainshaft are attached to it by collars. The aluminum oil pan bolts on from the bottom, and, in consequence, can be dropped to inspect the gears. The clutch pinion, countershaft or main shaft can be individually removed without dropping the transmission or disturbing any other part.

The transmission case is hinged in front to a channel section cross member and is supported behind by the jack shaft housings, which are bolted to it so as to form an integral part. These housings are held by spherical bearings in cast steel brackets bolted to the chassis side channel members. This arrangement prevents any temporary deflections or distortions in the chassis from straining any part of the transmission or from throwing it out of alignment, as the transmission case will adjust itself in the spherical bearings..

Features of the Transmission

The gears, which have a 1½-inch face, are made of an especially tough alloy steel heat-treated and very accurately machined. The teeth are generated on a gear shaper instead of being milled in the usual manner, so that friction losses are reduced as much as possible.

The main shaft, instead of being square, has feather keys cut from the solid material, this design giving a greater cross-section and consequently greater strength.

The contracting type foot brakes are each 13½ inches in diameter and 3 inches wide, giving the foot brakes an effective braking area of 225 square inches. Owing to the chain reduction, these brakes have as much braking effect on the rear wheels as the internal expanding emergency brakes, which are 18 inches in diameter, with a 4½-inch face, and a total effective braking area of 355 square inches.

The truck is equipped with a 2-inch pitch chain with rollers 1⅛ inches in diameter and 1¼ inches wide, whose strength is 44,000 pounds.

The rear axle is made of alloy steel and is rectangular in shape, being 3½ inches high by 2½ inches wide.

The wheels are carried on roller bearings guaranteed to carry 17,500 pounds per axle, a figure which would not be reached even under the maximum overload conditions.

The rear springs, which are 50 inches long and 3 inches wide, have a normal capacity of 6,000 pounds each. The front springs are 42 inches long and 3 inches wide, and have a capacity of 2,000 pounds.

The truck is fitted with a 3-inch jack spring hung parallel to and above the rear axle from a spring chair supported by diagonal frame members heavily reinforced by gusset plates, top and bottom. This jack spring was installed to absorb severe road

shocks and also to take care of any overloading of the rear springs.

One important feature in the spring arrangement is the device used in connection with the spring link bolts and shackles. In order to prevent wear, the hardened steel link pins which pass through the bronze spring bushings are welded to one shackle by an oxy-hydrogen process, making them a solid unit and preventing any relative movement between them. The other shackle is bolted on.

Heavy sprags, which can be dropped from the driver's seat by a chain on the steering post, are mounted on the rear axle.

Cast Steel Wheels Employed

The frame is strong and well designed. It is made throughout of pressed alloy channel steel, the side members of the frame being 6 inches high by 2½ inches wide by 5-16 inch thick, and held together by six channel section cross-members, heavily reinforced by large steel gusset plates.

The truck is equipped with 40-inch cast steel wheels, which are stronger than wooden wheels, and are not affected by road jars and vibration. The cast steel rear wheels weigh over 50 pounds less than similar wooden wheels. The front wheels are fitted with a single 6-inch solid tire, while the rear wheels each carry two 6-inch interchangeable solid tires.

The steering gear is of the screw and nut type, a triple thread screw of large pitch being used to lessen the wear. The horizontal steering wheel gives the operator greater leverage in steering, and subjects him to less fatigue.

The superstructure carrying the driver's seat is so arranged that it can be easily removed, in case it is wanted to grind the valves in the motor, without disturbing the control.

The gasoline tank, holding 25 gallons, is located under the driver's seat, and is connected with the carbureter by means of a flexible metallic tubing.

About 70 per cent. of the capacity load is carried on the rear wheels. This distribution gives maximum traction without loading the wheels beyond their effective adhesive weight, lightens the load on the front wheels, and offers the minimum load resistance, making steering easy and equalizing the tire wear between the front and rear wheels.

Standardization in the Drafting Room

H. Allen Suggests that Conservation of Time, Energy and Money Is Possible Through the Use of Standard Tables of Sizes in Properly Laying Out the Work Before It Reaches the Shop

STANDARDIZING the drafting room is one of the biggest factors in this department of the factory today. This standardization work can be carried on in many different ways. Each act of standardization calls for a tabulation which should be given to each draftsman. One example of this occurs in drilling holes for cotter-pins. Draftsman No. 1 might use a certain size drill and draftsman No. 2, working in the same drafting room, would indicate a different size drill for this work. As a solution of this difficulty, my suggestion is adopting the standards for cotter-pin drill sizes of Table No. 1. Give each draftsman a copy of this table and insist that all holes for certain size cotter-pins be of the same size, irrespective of the person doing the work.

TABLE NO. 1—STANDARD SIZE DRILLS FOR SPRING COTTER-PINS

Size of Pin		Size of Drill	
1/16-inch	No.	48, .076	inch
3/32 "	"	38, .101	"
1/8 "	"	28, .140	"
5/32 "	"	21, .159	"
3/16 "	"	12, .189	"
7/32 "	"	2, .221	"
1/4 "	"	F, .257	"
5/16 "	"	O, .316	"

As 1/16, 3/32 and 1/8-inch pins are used more than any other, it is very easy to remember for 1/16 pin to use No. 48 drill; for 3/32 use No. 38 drill, and for 1/8-inch pin use No. 28 drill.

The adoption of standard sizes for drills and standard sizes for bosses is an excellent idea. Such a tabulation is shown in Table No. 2, of which each draftsman is given a copy. This table is divided into three divisions:

First, pipe tap bosses; second, S. A. E. bolt bosses; and third, U. S. S. cap screw and coupling bolt bosses.

The first column in each division gives the size drill to use for each given tap; the second column gives the size of tap and the third column gives the size of boss. The benefit of the last column can be readily seen, as it stops a draftsman from having to figure out each time what size to make each boss for a given size tap. For instance, one man might make a boss for a 1-8-inch pipe top 5-8-inch in diameter; another man would make it 7-8, and so on; another would lay it out and when he thought it was big enough he would then dimension it. This makes the bosses of all different sizes by different draftsmen. With this table, a draftsman has it right before him and knows right away what size to make the boss. For example: He is using a 1-4-inch pipe tap. Glancing at the table, he finds the size of boss to be 1 inch and also the tap drill size 29-64, which he puts on the drawing. Thus he uses drill 29-64 and tap 1-8-inch pipe. It will thus be seen that all information is given, even to the drilling department. The last division is divided off into different shapes of the screw heads. For instance: The third column in the third division calls for the size of boss for a flat, hexagon and square head bolt.

TABLE NO. 2.—STANDARD SIZE DRILLS AND STANDARD SIZES OF BOSSES

Pipe Tap Bosses			S.A.E. Bolt Bosses			U.S.S. Cap Screws and Coupling Bolt Bosses				
Size Drill	Size Tap	Size Boss	Size Drill	Size Tap	Size Boss	Size Drill	Size Tap	Size Boss Flat, Hex., Square	Size Boss Ad. Fill. Button	Size Boss Coupling Bolt
In.	In.	In.	In	In.	In.	In.	In.	In.	In.	In.
21/64	1/8–27	11/16	No. 4 (.209)	1/4–28	3/8	No. 9 (.196)	1/4–20	11/16	3/8	11/16
29/64	1/4–18	1	17/64	5/16–24	13/16	1/4	5/16–18	1	1 1/16	1
33/64	3/8–18	1 1/4	25/64	3/8–24	1 1/16	5/16	3/8–16	1 1/8	1 1/16	1 1/4
37/64	1/2–14	1 1/16	29/64	7/16–20	1 1/16	3/8	7/16–14	1 1/16	1 1/16	1 1/16
11/32	3/4–14	1 1/2	33/64	1/2–20	1 1/4	7/16	1/2–13	1 1/16	1 1/8	1 1/16
1 3/32	1 –11 1/2	2 1/8	9/16	9/16–18	1 1/8	1/2	9/16–12	1 1/4	1 1/8	1 1/4
1 11/32	1 1/4–11 1/2	2 5/16	5/8	5/8–18	1 1/8	9/16	5/8–11	1 1/8	1 1/2	1 1/8
1 13/32	1 1/2–11 1/2	2 5/8	11/16	11/16–16	1 1/8	5/8	3/4–10	1 1/2	2 1/16	1 1/2
2 1/16	2 –11 1/2	3 1/2	3/4	3/4–16	1 1/2	3/4	7/8–9	2 1/16	.....	2 1/16
2 1/16	2 1/2– 8	4	13/16	7/8–14	1 1/2	7/8	1 –8	2 1/8	.....	2 1/8
3 1/16	3 – 8	4 1/2	7/8	1 –14	2 1/8	1	1 1/8– 7	2 1/16	.....	2 1/16

The third way in which drafting room practice can be standardized is in the use of certain drill sizes with any taper-pin. It was customary to take the small end of the taper-pin and use a corresponding size of drill, but with the method outlined in Table No. 3 it does not leave so much to ream. For example: For a No. 4 pin 3-4-inch long, use a No. 1 drill, .228 inch; for a No. 4 pin 2 inches long, use a No. 4 drill, .209 inch; and the

same way all through the table. It is best to mark pieces for a taper-pin thus: "Drill No. 4 (.209 inch) and rear at assembly for No. 4 taper-pin." Thus the drilling can be done ahead of time and by jigs, and the reaming can be done at assembly.

TABLE NO. 3—SHOWING POSSIBLE STANDARDIZATION IN DRILLS FOR TAPER-PINS

No. of Pin	Diam. at Large End A	Diam. at Small End B	Length of Pin C	Size of Drill to Use	Corresponding No. of T.P. Reamer	Diam. at Small End T.P. Reamer
0	.156	.140	3/4	29 (.136)	0	.135
0	.156	.135	1	29 (.136)	0	.135
1	.172	.156	3/4	25 (.1495)	1	.146
1	.172	.151	1	26 (.147)	1	.146
1	.172	.146	1 1/4	26 (.147)	1	.146
2	.193	.177	3/4	17 (.173)	2	.162
2	.193	.172	1	18 (.1695)	2	.162
2	.193	.167	1 1/4	19 (.166)	2	.162
2	.193	.162	1 1/2	19 (.166)	2	.162
3	.219	.203	3/4	7 (.201)	3	.183
3	.219	.198	1	9 (.196)	3	.183
3	.219	.193	1 1/4	12 (.189)	3	.183
3	.219	.188	1 1/2	13 (.185)	3	.183
3	.219	.183	1 3/4	13 (.185)	3	.183
4	.250	.234	3/4	1 (.228)	4	.208
4	.250	.229	1	1 (.228)	4	.208
4	.250	.224	1 1/4	2 (.221)	4	.208
4	.250	.219	1 1/2	7/32 (.218)	4	.208
4	.250	.214	1 3/4	3 (.213)	4	.208
4	.250	.209	2	4 (.209)	4	.208
5	.289	.273	3/4	I (.272)	5	.242
5	.289	.268	1	H (.266)	5	.242
5	.289	.263	1 1/4	G (.2661)	5	.242
5	.289	.258	1 1/2	F (.257)	5	.242
5	.289	.253	1 3/4	1/4 (.25)	5	.242
5	.289	.247	2	D (.246)	5	.242
5	.289	.243	2 1/4	D (.246)	5	.242
6	.341	.325	3/4	P (.323)	6	.273
6	.341	.320	1	O (.316)	6	.273
6	.341	.315	1 1/4	5/16 (.312)	6	.273
6	.341	.310	1 1/2	N (.302)	6	.273
6	.341	.305	1 3/4	N (.302)	6	.273
6	.341	.299	2	M (.295)	6	.273
6	.341	.294	2 1/4	L (.290)	6	.273
6	.341	.289	2 1/2	9/32 (.281)	6	.273
6	.341	.284	2 3/4	K (.281)	6	.273
6	.341	.279	3	J (.277)	6	.273
6	.341	.273	3 1/4	I (.277)	6	.273
7	.409	.388	1	W (.386)	7	.331
7	.409	.383	1 1/4	V (.377)	7	.331
7	.409	.378	1 1/2	3/8 (.375)	7	.331
7	.409	.373	1 3/4	U (.368)	7	.331
7	.409	.367	2	23/64 (.359)	7	.331
7	.409	.362	2 1/4	T (.358)	7	.331
7	.409	.357	2 1/2	T (.358)	7	.331
7	.409	.352	2 3/4	S (.348)	7	.331
7	.409	.347	3	11/32 (.343)	7	.331
7	.409	.341	3 1/4	R (.339)	7	.331
7	.409	.336	3 1/2	Q (.332)	7	.331
7	.409	.331	3 3/4	Q (.332)	7	.331
8	.492	.466	1 1/4	29/64 (.453)	8	.398
8	.492	.461	1 1/2	29/64 (.453)	8	.398
8	.492	.456	1 3/4	29/64 (.453)	8	.398
8	.492	.450	2	7/16 (.437)	8	.398
8	.492	.445	2 1/4	7/16 (.437)	8	.398
8	.492	.440	2 1/2	7/16 (.437)	8	.398
8	.492	.435	2 3/4	7/16 (.437)	8	.398
8	.492	.430	3	27/64 (.422)	8	.398
8	.492	.424	3 1/4	27/64 (.422)	8	.398
8	.492	.419	3 1/2	7 (.413)	8	.398
8	.492	.414	3 3/4	7 (.413)	8	.398
8	.492	.409	4	Y (.404)	8	.398
8	.492	.404	4 1/4	Y (.404)	8	.398
8	.492	.398	4 1/2	Y (.404)	8	.398
9	.591	.560	1 1/2	35/64 (.547)	9	.482
9	.591	.555	1 3/4	35/64 (.547)	9	.483
9	.591	.549	2	(35/64 (.547)	9	.482
9	.591	.544	2 1/4	17/32 (.531)	9	.482
9	.591	.539	2 1/2	17/32 (.531)	9	.482
9	.591	.534	2 3/4	17/32 (.531)	9	.482
9	.591	.529	3	33/64 (.516)	9	.482
9	.591	.523	3 1/4	33/64 (.516)	9	.482
9	.591	.518	3 1/2	33/64 (.516)	9	.482
9	.591	.513	3 3/4	1/2 (.500)	9	.482
9	.591	.508	4	1/2 (.500)	9	.482
9	.591	.503	4 1/4	1/2 (.500)	9	.482
9	.591	.497	4 1/2	31/64 (.484)	9	.482
9	.591	.492	4 3/4	31/64 (.484)	9	.482
9	.591	.487	5	31/64 (.484)	9	.482
9	.591	.481	5 1/4	31/64 (.484)	9	.482
10	.706	.675	1 1/2	43/64 (.672)	10	.581
10	.706	.670	1 3/4	21/32 (.656)	10	.581
10	.706	.664	2	21/32 (.656)	10	.581
10	.706	.659	2 1/4	21/32 (.656)	10	.581
10	.706	.654	2 1/2	41/64 (.641)	10	.581
10	.706	.649	2 3/4	41/64 (.641)	10	.581
10	.706	.644	3	41/64 (.641)	10	.581
10	.706	.638	3 1/4	5/8 (.625)	10	.581
10	.706	.633	3 1/2	5/8 (.625)	10	.581
10	.706	.628	3 3/4	5/8 (.625)	10	.581
10	.706	.623	4	39/64 (.6094)	10	.581
10	.706	.618	4 1/4	39/64 (.6094)	10	.581
10	.706	.612	4 1/2	39/64 (.6094)	10	.581
10	.706	.607	4 3/4	19/32 (.594)	10	.581
10	.706	.602	5	19/32 (.594)	10	.581
10	.706	.597	5 1/4	19/32 (.594)	10	.581
10	.706	.591	5 1/2	19/32 (.594)	10	.581
10	.706	.586	5 3/4	19/32 (.594)	10	.581
10	.706	.581	6	19/32 (.594)	10	.581

Another table that is very useful in laying out work for clearance in close quarters is for the size of machine screw nuts. I do not recall ever seeing it in any of the handbooks. Table No. 4 shows this.

TABLE NO. 4—FLATS OF HEXAGONAL NUTS SAME AS FLATS OF SQUARE NUTS

Nut Size	Across Flats	Thickness
4–36	9/32-inch	3/32 inch
6–32	5/16 "	1/8 "
8–32	11/32 "	1/8 "
10–24	3/8 "	9/64 "
12–24	7/16 "	5/32 "
14–20	1/2 "	3/16 "
16–18	17/32 "	13/64 "
18–18	9/16 "	1/4 "
20–16	5/8 "	9/32 "
24–16	21/32 "	5/16 "

When drawings are made and go to the pattern shop with just the ordinary "f" marks on, the pattern maker has to ask his foreman how much finish to put on each place. By using a stamp, Table No. 5, and marked drawings f^1 it shows the pattern maker to put 1-32 finish in that place, f^2 means 1-16 finish, etc., and it also keeps pattern maker from putting on too much finish and making heavy castings.

TABLE NO. 5—PATTERN SHOP STAMP

NOTE
F—FINISH

$F_1 = \frac{1}{32}$" FINISH
$F_2 = \frac{1}{16}$" "
$F_3 = \frac{3}{32}$" "
$F_4 = \frac{1}{8}$" FINISH
$F_5 = \frac{3}{16}$" "
$F_6 = \frac{1}{4}$" "

CAUTION

READ ALL NOTES BEFORE STARTING WORK.
WORK MUST BE TO DECIMAL LIMITS.
ALLOWANCE OF .010 INCH EACH WAY ON FRACTIONAL DIMENSIONS. DO NOT SCALE DRAWINGS.

Among the New Books

THE MOTORIST'S GUIDE, published by the Berry Company, Kansas City, Mo., under the direction of the Automobile Club of Kansas City. 117 pages, paper cover, $2.

Comprising several tours out of Kansas City to points of interest throughout the state. The guide is fully illustrated by maps but lacks the descriptive matter generally given in a tour book. This might be said to rob the work of a certain charm, although it may be forgiven in view of the fact that the directions are complete and thorough.

BRAZING AND SOLDERING, by James F. Hobart, fifth edition, published by the Norman W. Henley Publishing Company, New York City. 51 pages, illustrated. Price 25 cents.

A manual on the art of brazing or soldering which of such size and binding that it can be conveniently slipped in the pocket. Formulas for the making of different solders and the flux to be used with each are given in a summary at the end of the book where they can be readily found when wanted. It should prove a useful book for apprentices or helpers not having the experience necessary to remember all the required formulas.

THE POLYTECHNIC ENGINEER, for 1912. Published annually by the undergraduates of the Polytechnic Institute of Brooklyn, under the auspices of the Polytechnic Institute Section of the American Society of Mechanical Engineers. 132 pages, 6 by 9 inches, illustrated. Cloth, $1.

Containing papers which are always of intense interest, owing to their timeliness, this annual work is always welcomed. Among the more interesting papers are: Testing and Manufacture of Smokeless Powders at the United States Naval Proving Ground, by John C. Olsen; Deflection Due to Shear, by Edward J. Squire; The Selection of Material for Machine Parts, by C. W. Gremple, and Problems in the Manufacture of Chemically Pure Acids, by C. W. Gremple. An outline of the course pursued at the Polytechnic Institute is also given, along with some interesting editorial notes and reports of the various students' technical societies.

Harking Back a Decade

What the Automobile Journals of 10 Years Ago Had to Say Concerning the Happenings of the Day

FROM *The Automobile and Motor Review,* June 28, 1902:

Some of the American automobile factories produce vehicles of various patterns, just as the large carriage factories turn out numerous styles. However, it is true that at present the different patterns of automobiles represent more nearly the work of different factories than do the different styles of carriages.

The muffler is one of the prominent features of the Oldsmobile, being the cause of the frequent comments passed concerning the quietness of running of the machine by a number of parties.

The recent stand of the Automobile Club of America against all road races threatens a cessation of these important events on this side of the ocean and similar efforts are being made in France, Switzerland and Germany, so that the road race may be considered as on trial for its life.—Editorial.

Recent transfers of farm properties in Nassau County on Long Island give to a group of wealthy automobile enthusiasts a continuous strip of land from Long Island City to the country home districts of Nassau and Suffolk counties. Talk of the building of a motor parkway is again in circulation.

W. K. Vanderbilt, Jr., David Wolfe Bishop, Foxhall Keene and Albert C. Bostwick will be the American representatives in the Paris-Vienna race scheduled for next week. There are 177 entries.

Impounding automobiles for various periods after their owners have been found guilty of speed law infractions has been suggested in New York. This might work out all right except that where a wealthy speedster owned several cars, one or more of them might be in the pound, but there would be nothing to prevent him from using others.

Suit for $25,000 damages has been filed by Everson Stout, of Indianapolis, Ind., in the Superior Court as the result of the accident that befell Mr. Stout last winter while a passenger in an electric car which tumbled from the incline at the automobile show and thereby smashed several exhibits besides injuring Mr. Stout.

The Steamobile Company of America has sold out to the Standard Roller Bearing Company and will retire permanently from the automobile manufacturing field.

Winton's Bullet to the Fore

ALEXANDER Winton expects to test his new racing machine, which he has named "Winton's Bullet," next week. He expects to get 80 miles an hour out of the new racer.

After a most successful period, both from a financial and non-financial point of view, the National Exhibition of Berlin, the forerunner of a much larger international show during the coming year, has closed its doors. Racing automobiles and two-seated voiturettes were scarce, the main lines being represented by comfortably sized cars almost exclusively.

The recent escape of the Humbert family of swindlers has resulted in much annoyance to automobile tourists in France. Ever since the disappearance of the much-sought family it has been the custom to halt every likely-looking automobile party and make the members prove their identity. Among the notables who have been searched so far are Prince Egon of Furstenberg, and three American parties.

Philadelphia is making a bid for space in the spotlight of publicity by considering the enactment of an ordinance to limit the speed of automobiles in the central part of the city to 5 miles an hour.

There are now more than 600 automobiles in California, of which 400 are operated in San Francisco. Gasoline and steam cars are made at the Golden Gate, but so far no electric automobiles.

A free school to familiarize horses with automobiles is about to be started at Kenosha, Wis. The feature of the curriculum will be a training track around which automobiles will be run for the instruction of the horses.

Arrangements are being made for a 1,000-mile race against time on Long Island. A French car equipped with water and gasoline tanks large enough to carry supplies for the whole distance, so that the wheels need never stop turning, will be used. No provision for replacing tires under the same conditions have been made.

A tax of 1 franc, or 19.3 cents, per quintal of 220.46 pounds on crude petroleum has been adopted by the French Chamber of Deputies. Heretofore the tax on petroleum has been $1.74 per quintal.

A Duryea three-wheeler made 3 miles from a flying start on a half-mile dirt track at Reading in 5:08, which is the best time on record in the United States for a gasoline vehicle on a circular track.

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Cooling Water in Alcohol Motors—The consumption of cooling water is about the same for most of the small alcohol and benzine motors in the German market—namely, about a quart per horsepower hour. This consumption is about the same whether cooling is effected by evaporation or by water circulation, the former being the more simple of the two.

—

Decreasing Motor Compression—It is easy to decrease the compression of a motor. Place gaskets between the crankcase and the cylinder until the required decrease has been made. Fiber is the best material to use for these gaskets. It is not advisable to attempt to shave material off the tops of the pistons in an effort to reduce compression as the pistons are generally as thin as is compatible with safety, and to further reduce the thickness of the material is dangerous. It is not safe to shorten the connecting-rod either, for, when this is done, the angularity is increased so that there is danger of the connecting-rod striking the crankcase.

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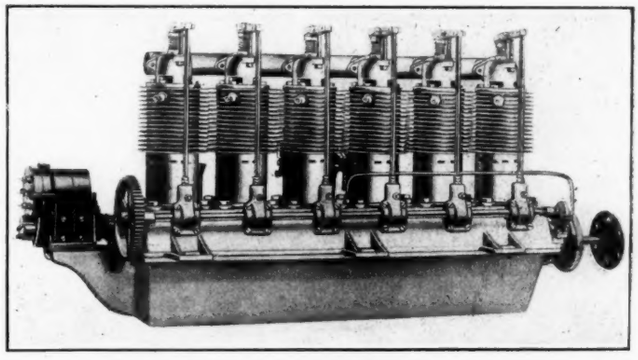
Light Motor with Concentric Valves

A new light motor which is especially adapted for aviation work has been brought out by R. O. Rubel, Jr., and Company, of Louisville, Ky. It is illustrated herewith. The most prominent features of the motor are its large concentric valves, situated in the head of the cylinder. Everything has been done to make the motor as light as possible, semi-steel cylinders being used and a solid vanadium steel crankshaft. As a special inducement the makers maintain an aviation field which the users of the motors may occupy while trying out their motors.



New type of light concentric valve motor

Digest of the Leading Foreign Journals

Synopsis of European Efforts for Reconciling Rapid and Automatic Mass-Production of Automobiles with Improvements in Accuracy of Dimensions and Durability —A Move Toward Larger Payloads for Omnibuses—Vibrating Shafts

MANUFACTURING METHODS.—The international struggle for supremacy in the economical fitness of manufacturing methods is working itself toward a keener edge than ever before. Realizing at last that the future in automobile manufacture belongs exclusively to those who learn to combine high quality with low cost of production, the leaders among European engineers are now turning their attention to the most fundamental requirements for reconciling rapid mass-production, which is necessary for economy, with a new standard of excellence in which the early adoption of advanced design is relegated to second or third place, while the durability and reliability of the finished product are safeguarded far better than they ever could be under the old system of depending mainly for accuracy in dimensions and the properties of the materials, upon the individual skill of specially trained workmen. The salient feature in the new movement, as it is cropping out in Europe, lies less in the adoption of the practice of designing and building new machinery specially for the production of the parts wanted for any new model of automobile which has been decided upon, than in the devising of special measuring instruments so nearly automatic in their action that they will secure accuracy in dimensions of parts and secure it cheaply, even when placed in the hands of the most ordinary workman and, furthermore, in highly simplified machinery for testing raw materials and finished parts for the physical properties required of them.

To Measure or to Compare—Which?

Just to what extent the American practice is gaining headway which consists in supplying each workman with inalterable samples of the one or two measurements which it is incumbent upon him to duplicate—these samples being produced in advance of all other manufacturing processes and with extraordinary care—does not appear from the articles on the subject which are published with some frequency of late in the technical periodicals of Europe. Perhaps this practice is looked upon as a self-evident extension of the jig-and-templet system which is known all over the industrial world as indispensable in the assembling departments, and the economic importance of its application to the primary production of parts on the machine tools, in the foundry and in the drop forge shop, has possibly not yet been fully recognized abroad. The mere fact that great stress is laid upon the perfecting of instruments, such as the "minimeter" partially described in THE AUTOMOBILE of May 2, by means of which the workman can make any one of a number of different measurements with great accuracy and speed, seems to indicate that specialization in the producing system is not yet being forced to the last notch and that the Europeans still prefer to keep open the chance of switching a machine tool from one job to another or shrink from the expense of providing new measurement-"normals" for every variation in design and dimensions. The limited home markets of Europe may account for the difference in policy, and a close analysis might also find a temperamental desire to keep ahead of America by a greater mobility in design and adoption of improvements.

With regard to the simpler methods introduced for the testing of materials, before and after machining and heat-treatment, mention was made in THE AUTOMOBILE of March 14 of the great favor now accorded the Brinell method for testing hardness and at the same time determining the tensile strength and the elastic limit by simple reference to a table based on certain fixed or nearly fixed relations between the figures expressing these properties and the hardness number (or rather density number, since the Brinell method does not give the mineralogical hardness but a property in which hardness and toughness both enter as factors). In the issues of Dec. 21, 1911, and Feb. 29, this year, brief descriptions were given of new machines for locating errors in the cut of gear teeth and of a rotary ram designed for shock-tests of materials and admitting of very quick decisions. On April 4 a machine for polishing test pieces was described.

In all of these innovations there is noticed a desire to emancipate the attainment of extreme accuracy—which is a paramount requirement if cheap and efficacious replacements shall take the place of expensive and yet unsatisfactory repairs in the long-time use of an automobile—as well as the safeguarding of the strength of materials from all question of individual skill among workmen, and this desire is coupled with a strong effort for saving time and risky reasoning in the departments of supervision and testing. Academic considerations are very plainly thrown to the winds, when, for example, in the Brinell test, the matter of the composition and hardness of the steel ball with which the imprints are made is left to the manufacturer supplying the machine and the balls, on the principle that wherever this testing machine is used for practical purposes the main object should be to establish comparative figures for the different materials under consideration rather than absolute figures which would hold good in comparison with other tests made in other places and with other machines. This inferiority of the Brinell method from a scientific standpoint—in not giving figures of the same universal validity as those obtained by the old laborious method of pulling standard test specimens—is disregarded in consideration of its practical advantages and its rapidity, as is also its acknowledged inapplicability to cast iron and case-hardened articles. A large number of uses remain for which it is industrially superior.

Brinell Conversion Formulas.

As in other similar cases, the movement for simplified testing apparatus owes its impetus largely to the initiative of a few individuals and concerns. Brinell designed his apparatus in 1900, submitting it to the Swedish Technological Society, and the Copenhagen engineering congress held in 1910 finally brought it

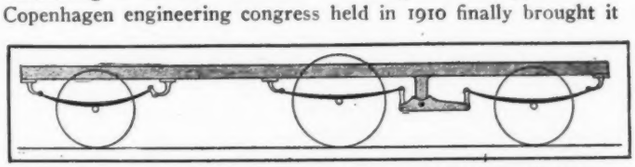


Fig. 1—Brillié spring suspension for six-wheeled omnibuses

prominently before the technical public. It is now manufactured not only by the Alpha company of Stockholm, but also by two German concerns, and the renowned automobile parts maker, the G. Derihon company of Loucin, Belgium, and Jeumont, France, manufactures a simplified model especially intended for automobile manufacturers, as well as for the company's own use. The tables compiled for facilitating the use of these machines are calculated on the basis of the formula:

$$H = \frac{P}{\frac{\pi \cdot D}{2}(D - \sqrt{D^2 - d^2})}$$

in which H is the density number, D the diameter of the steel ball used for making the imprint in the test piece, in millimeters; d the diameter of the imprint, also in millimeters and fractions thereof, and P the pressure applied to D, in kilograms. By comparison with tensile tests it has been found that the tensile strength in kilograms per square millimeter is obtained from the density number by multiplying the latter with either 0.354 or 0.362 when the density number lies below 175, giving a working average of 0.358; but when the density number is higher it should be multiplied by a slightly lower coefficient, averaging 0.334.

Measuring Wearing Qualities

Among testing machines developed by the Derihon company there is also one for deciding quickly the wearing qualities of a material. (This also seems to be designed to give valuable pointers rather than absolute figures, inasmuch as neither the material of the pressure-disk employed in it nor the area of the rubbing-surface seems to be susceptible of ready variation.) A side view of this machine is shown in Fig. 2. The waterjacketed housing R is one-third filled with lubricating oil, and in it is mounted the disk O, which is made of an especially hard alloy and the circumference of which is exactly 1 meter, giving a circumferential velocity of 8 to 50 meters per second at 500 to 3,000 revolutions of the disk per minute. The test material is fitted into a prismatic guide piece V which holds it against the top of the disk, passing snugly through an opening in the top of the housing. The pressure is applied through the knife-edge lugs B on a lever fulcrumed at A and loaded at C by means of the weight P. Compensation for the weight of the lever itself—which otherwise would be a disturbing constant in all comparisons—is provided through another lever E whose fulcrum is at M, while the weight Q, suspended at F, applies the required lift by means of lugs D to the yoke G which receives the downward pressure of the other lever ABC by means of lugs B. The ratio of the lever arms AB and AC is as 1 to 12, and at L there is a knife-edge lug whose distance from B gives exactly a 10 times greater movement to this point of the lever than that to which the point B is subject when the test piece wears down under the abrasive action of the disk O. By means of the micrometer screw K, at the fixed point N of the machine, which admits of readings down to a 1/100 part of a millimeter, it is therefore possible to determine wear of the test piece within limits of 1/1,000 part of 1 millimeter. At the beginning of a test, the lever ABC is first placed horizontally, for which purpose the point A may be adjusted by the screw H. And the micrometer screw K is turned until an electric circuit, which is closed when L touches K, moves the hand of a galvanometer. After the end of the test the micrometer screw is turned down till the contact is again closed and the hand of the galvanometer again moves. By this arrangement the reading is made independent of the sensibilities of the operator. Thermometers admit of reading the temperature of the cooling water, and of the test-piece itself, while an odometer and a cyclometer measure the speed and the total number of revolutions involved in a test. The apparatus is driven by an electric motor and a voltammeter serves to check possible irregularities in the power, so that these may be taken into account if necessary.

Tests with this apparatus have demonstrated surprising variations in the wearing properties of steels whose chemical compositions were very similar and have, in the practice of the Derihon company, led, for example, to the adoption of a certain air-hardening method in the treatment of large bevel-gear crowns for automobiles, the method giving a minimum of deformation and wearing qualities almost equal to those obtained by casehardening of another chrome-nickel steel of lower carbon content, although its mineral hardness is considerably lower. —From *Der Motorwagen*, May 20.

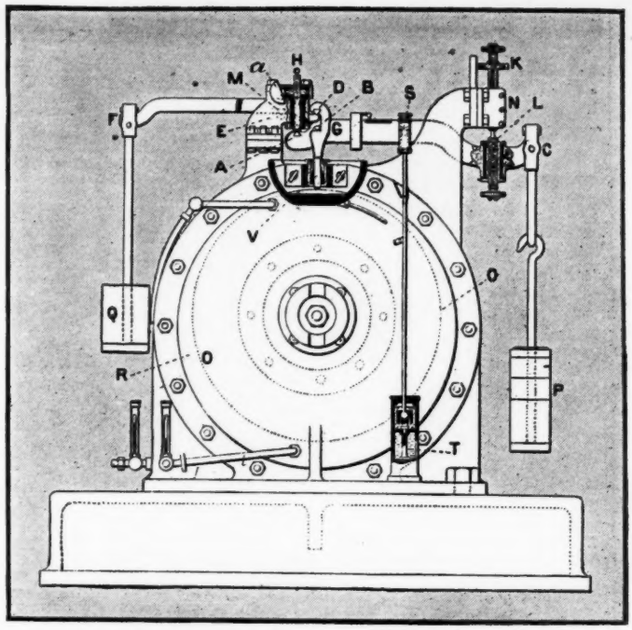


Fig. 2—Derihon machine for measuring wear of materials

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Six-Wheel Omnibuses—The General Omnibus Company of Paris intends to place in circulation before long a small number of vehicles with three pairs of wheels of which the middle pair are to be drivers, while the steering will be done with both the front and rear pairs. The objects to be attained are increased carrying capacity, ability to turn in a small circle, and the avoidance of skidding, but the spring suspension of the three axles presents a problem which has not heretofore been satisfactorily solved. The system which will be tried out first is that which has been devised by Brillié for Schneider omnibuses. In this, it is only the two rear pairs of wheels whose spring suspensions are connected, while the front axle is independent. The front ends of the driving-wheel springs and the rear ends of the rear wheel springs are attached directly to the frame reaches, but the intermediate ends of these springs are shackled to the ends of a balancing lever which is secured horizontally under the frame reach free to oscillate around a fixed pivot. The two arms of this lever are of unequal length, however, the arm nearest the driving-wheel axle being about one-third the length of the other with the purpose of making the driving-wheels continue to carry the bulk of the load when they pass over an obstacle, or when the vehicle load is too far to the rear, as may easily happen with an omnibus. The accompanying side view, Fig. 1, shows the general plan of this system of suspension, which is considered the simplest yet devised. To facilitate the compensating action between the two axles, it is necessary to allow the wheel axles to turn in the spring clips or fastenings.—From *Omnia*, May 25.

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Critical Speeds—Renewed experiments by German engineers show great irregularity in the periods of excessive vibration observed in connection with rotary shafts, indicating that the phenomenon, which is ascribed to rhythmic coincidence in periods of oscillation, must be obviated experimentally in each instance.

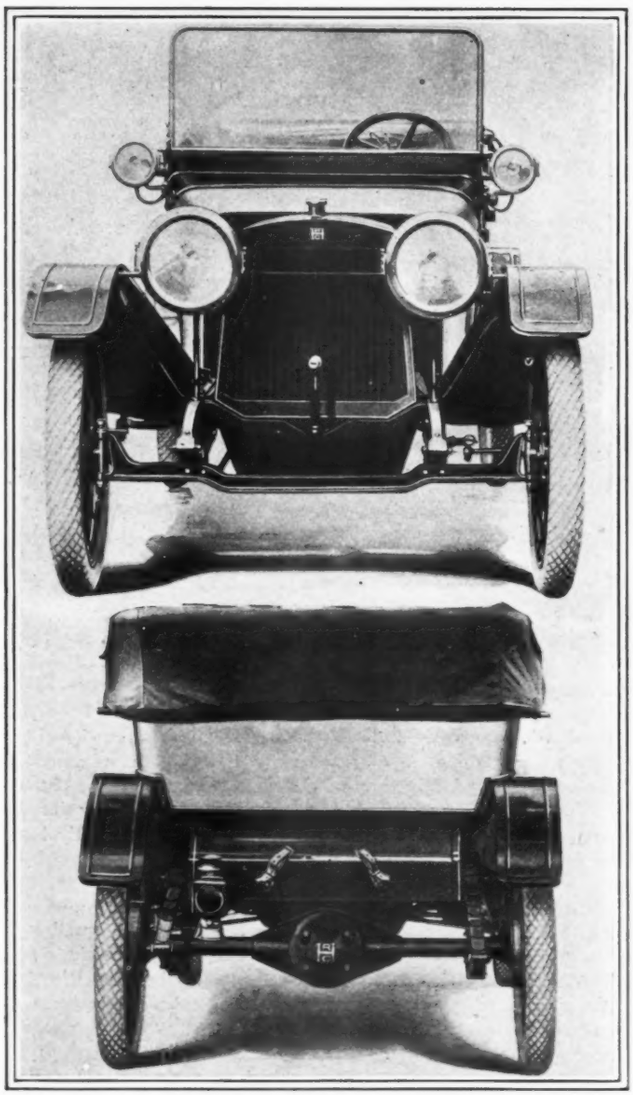

Fig. 1—Front and rear views of new R-C-H product

R-C-H 1913 Models

While No Radical Changes Have or the Body Design, Special Provide Highest Class of

Electric Lighting, Non-Skid Tires, Special Curtains, Auto-Cars Are Standard in This

BELIEVING that full equipment will be the keynote for the coming year, the R-C-H Corporation has announced its models for 1913 with this as the talking point. Practically no changes have been made in motor, transmission or in body design, the car presenting the same general lines that characterized it when it first made its appearance in the motoring world less than a year ago.

The equipment of the new models will be most complete, consisting of non-skid tires on all four wheels, size 32 by 3 1-2 inches, electric lighting, Bosch magneto, Warner Auto-Meter, demountable rims, extra rim holders, Tally-ho horn, Jiffy side curtains, top and top-cover, windshield, rear-view mirror, robe-rail, tool-kit, tire-repair kit, jack, and pump. In so equipping this machine, R. C. Hupp is of the opinion that 1913 will be a season in which the convenience and comfort of the passenger and driver will be demanded. The fitting of electric lighting, non-skid tires, special curtains and Warner Auto-Meter to cars in the $900 class is an innovation for which the R-C-H is responsible.

The lamps on the new R-C-H cars are all of the bullet type, the headlights being 12 inches in diameter and fitted with parabolic lenses and 16-candlepower bulbs. The two side lamps are 6 inches in diameter, have the parabolic lenses also, and 4-candlepower incandescent globes, while the rear light measures 4 inches and carries a 2-candlepower bulb. On the headlights the parabola is set into the lamp body, permitting of easy access to the focusing device and facilitating the cleaning of the reflectors while they remain in place. The sockets for all the lamps are of Edison make. Current for the illumination is furnished by a

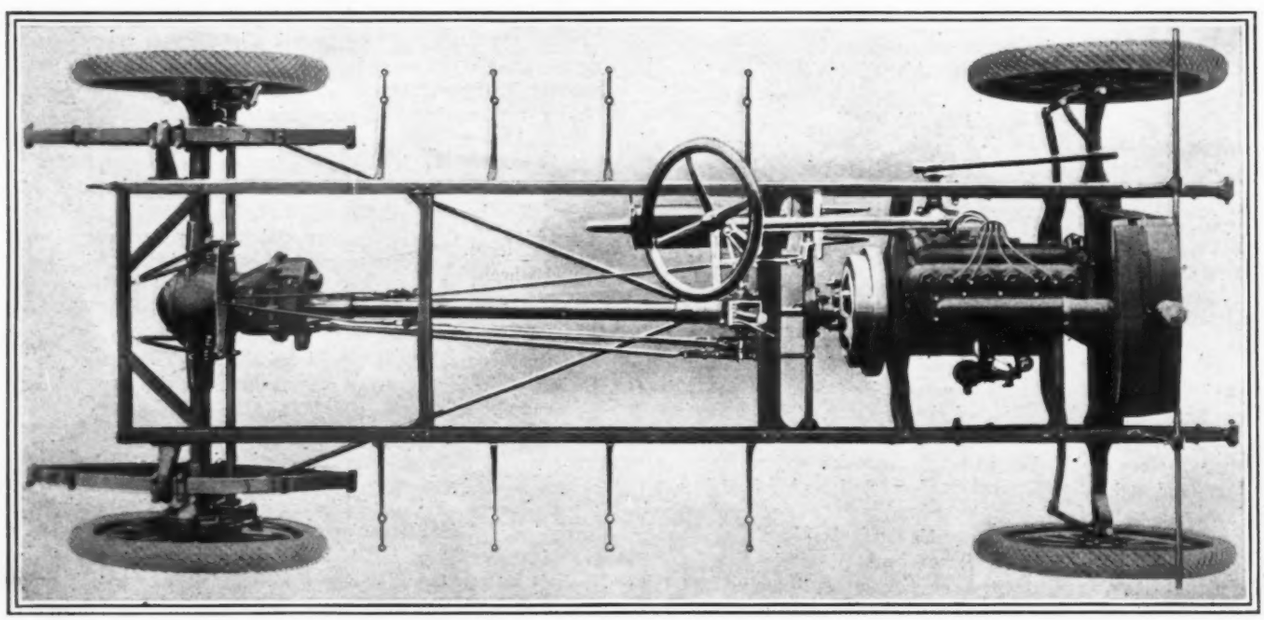

Fig. 2—Plan view of chassis, showing motor suspension, torque arrangements and principal control features

Now on the Market

Been Made in Motor, Transmission Efforts Have Been Made to Equipment Throughout

Meter and Other Adjuncts Peculiar to High-Priced Year's R-C-H Products

100-ampere storage battery which is carried within a case on the running board.

The only mechanical changes which the new car shows are the placing of a hand-throttle lever and spark lever on the steering column just below the wheel, and the addition of a hand-lever emergency brake in place of the former foot emergency brake. In the previous cars, two foot-brake pedals were used, one being the clutch and service brake combined, while the other operated the rear brake drums. The service brake operates on the transmission, as in the earlier model, but it is now a separate pedal, while the lever replaces the other brake pedal to bring the emergency hub brakes into play.

No change whatever has been made in the four-cylinder, monoblock motor, which has a long stroke of 5 inches and a bore of 3 1-4 inches. The rating is given at 25 horsepower. The crankshaft is mounted on two bearings—one at either end, which is in keeping with the general compact construction of the power plant. The motor is mounted in the frame of the car on the three-point suspension principle, there being a support at either side of the crankcase in front and one in the center in the rear. The valve rods and springs are all inclosed by an easily-removable cover-plate, while the timing gears are housed by plates fastening with cap screws. The Bosch high-tension magneto with single set of spark plugs is used, while the carbureter is of the latest B-D make.

The transmission, which is integral with the rear axle, is of the three-speed selective, sliding-gear type, the power being transmitted to it through a clutch of the dry plate form. The gearbox is mounted amidships of the frame, being supported by a cross member. The rear axle is semi-floating, the power reaching it through the agency of the amply-proportioned propeller shaft, which has one universal joint mounted back of the gearbox and which is inclosed in a torsion tube bolted to the rear axle. Two radius rods pass from the axle to the torsion tube for properly bracing the former, and for maintaining its correct alignment.

The rear springs are elliptic and they are mounted on swivel seats, taking much of the strain from the spring leaves. The front springs fasten directly to the I-beam, drop-forged front axle and they are of semi-elliptic construction.

The frame is of pressed steel, channel section, and it is braced at front, rear and center. The wheels are of artillery-type wooden construction, the designers, in keeping with most of the other American engineers, still adhering to them in place of the much-heralded wire types.

As to body design, this $900 touring car presents a decidedly foreign light-car appearance with its nearly square hood and

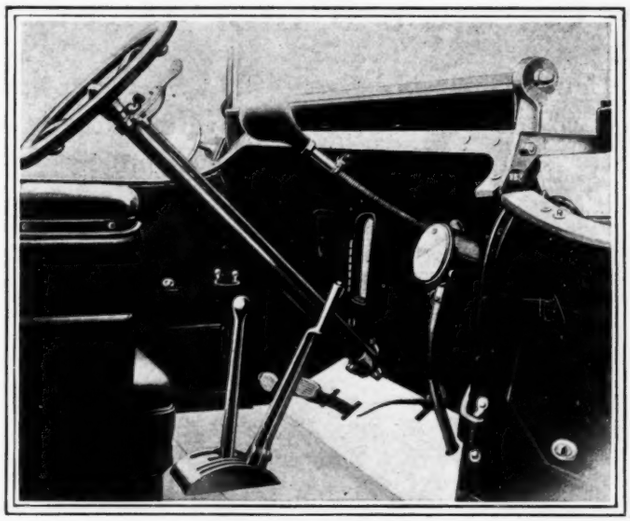

Fig. 3—Showing center control and dash features of new car

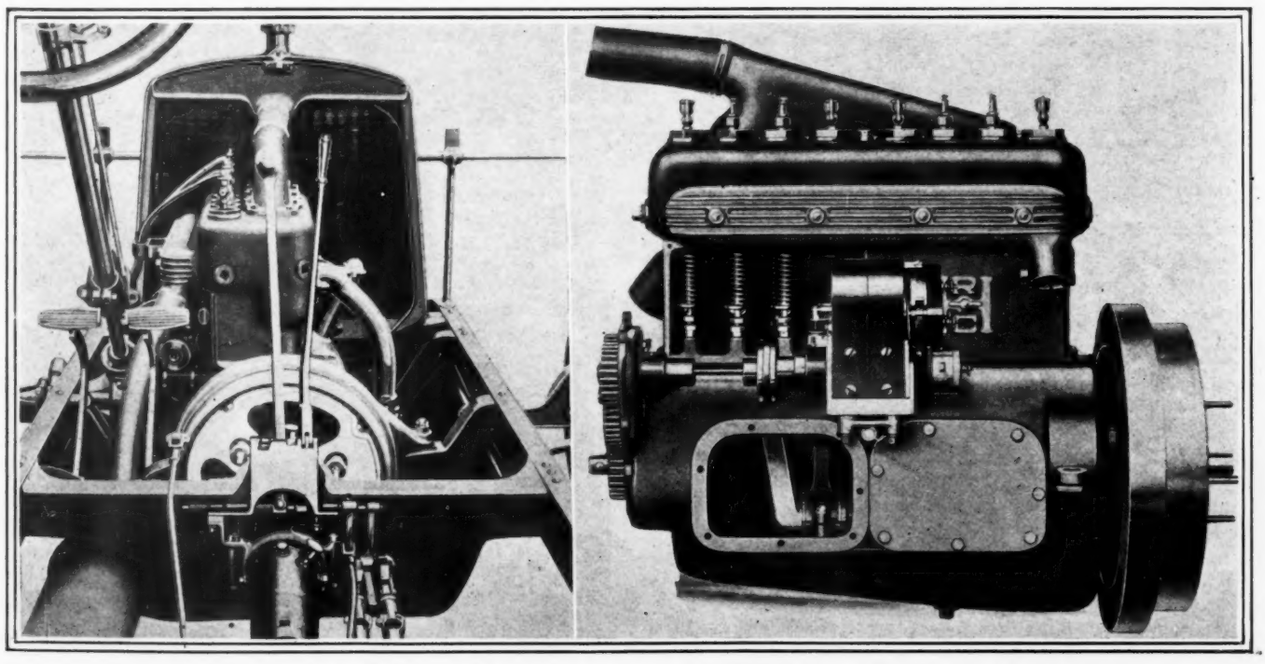

Fig. 4—Mounting of control levers and rigid cross member supporting clutch; view of magneto side of motor

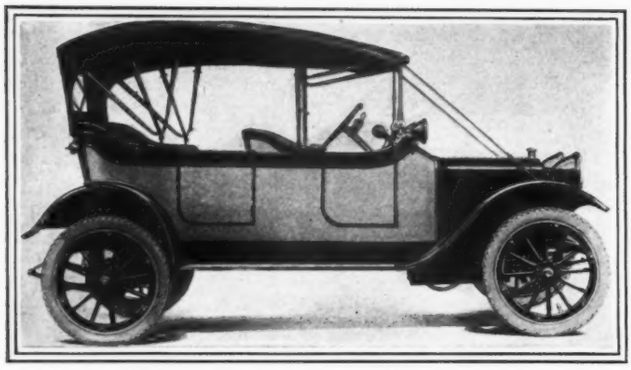

Fig. 5—R-C-H touring car with full equipment

Cost of Work With Gasoline Motor Trucks

Louis Ruprecht, S.A.E., Calls Attention to the Methods of Obtaining Maximum Efficiency With Economy

Proper Routing—Improving the Load-Handling Facilities—Increasing Daily Work—Comparative Illustrations

THE graphic charts of actual costs of operation, and cost per ton-mile of work of motor trucks herewith shown, are merely a tabulation, for convenient reference and study, of trucking economy under varying conditions of loads and mileage.

They are intended more as a comparative study than a discussion of specific costs, but it is nevertheless in order to review the detailed figures used in arriving at the total costs for plotting curves.

Depreciation is figured at from 10 to 15 per cent., varying according to mileage and the size of the units, the tire value being deducted from the cost of the complete vehicles. One of the highest-priced types of truck is assumed in each case. The depreciation figures are based on experience with hundreds of this type of truck in use over a long period of years, in many instances longer than 10 years. It is only fair to say that the depreciation of the newer, more flexible models will be less than that of the older ones.

Drivers' wages on 1000-pound delivery wagons are taken at $2.75 per day, and on trucks, $3 to $4 per day according to size and length of day's work. Helper on trailer $1 per day. These figures in the case of a very large day's work might conservatively be figured a trifle higher.

Garage charges include only washing and storing of the vehicle: $240 to $300 per year according to size.

Tire cost is based on prices to user and 8,000 miles life as guaranteed by makers. The sizes figured are all in accordance with the makers' specifications based on weights of vehicles and loads, and therefore this large item of expense is figured conservatively.

Gasoline cost is taken at 11 cents per gallon. The price at this writing is a little higher, but only 3 to 6 1-2 miles per gallon is assumed as the performance according to size of vehicle.

Oil cost is taken at 30 cents per gallon; 50 to 125 miles per gallon according to size of vehicle.

Insurance: $100 to $250 per year according to size.

Repairs and replacements have been figured up to 3 cents per mile in the case of heavy trucks. This is based on extensive records.

Operating days per year have been taken uniformly at 300. This figure is a trifle high, particularly in cases where large daily mileages are made, although it leaves 65 working days and holidays for the upkeep of the equipment.

Comparing Costs of Hauling

ATTENTION is now called to the set of curves showing actual costs of hauling, expressed in dollars per year, for different sizes of units for varying average daily mileage. The ordinates indicate the average daily mileage from 10 to 100 and the abscissæ the total cost per 300-day year, all charges included. It so happens that on the basis of these figures the plotted costs are straight lines in every case. This indicates that the *total cost increases in constant ratio with the daily mileage.* These straight lines if continued to zero miles should indicate theoretically therefore the fixed and other charges against the equipment when idle, and in fact this is approximately the case; for it will be found that costs thus indicated at zero miles are practically the sum total of Depreciation, Interest, Part-Time Wages, Dead Storage, Insurance, Tire Depreciation, etc., actually chargeable against a vehicle temporarily out of commission.

This situation has suggested to me a convenient thumb-rule for figuring costs of operation, making unnecessary the use of this chart, as follows:

Cost per Day = "Fixed Charges" + (Miles per Day × Daily Increment in Cost).

Size	Fixed Charges	Increment Per Mile
1000-lb.	5.07	.0686
3-ton	5.33	.0860
5-ton	5.60	.1253
6-ton	6.00	.1540
7-ton	6.15	.1718
12½-ton train	7.40	.2070

For example, the cost of operating a 6-ton truck, all charges included, 45 miles per day, will be $6.00 + (.1540 × 45) = $12.93.

Costs per ton-mile can of course be derived similarly without reference to the second set of curves seen in Fig. 2; for

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sweeping lines. The cowl has a low slope which is set off by the same design of windshield as marked the car on its début. The door handles are all inclosed, while, except for the battery box, the running boards are clear. The interior of the car has been designed to give the maximum of leg room consistent with the wheelbase of 110 inches. Seats are set at a comfortable angle, which the designers have deemed most restful for all occasions.

The two-passenger roadster is continued in two models, the standard and the EE types. The former, selling at $700, has gas head lamps, oil side and tail lights, 30 by 3-inch tires on clincher rims, gas generator, top and Jiffy curtains and horn as its regular equipment, while the EE model, which is to cost $750, has the same equipment except that a Prest-O-Lite tank takes the place of the generator and 32 by 3 1-2-inch tires on demountable rims are substituted for the 30 by 3-inch tire equipment. In all respects, these roadster models retain the mechanical construction as outlined for the touring car.

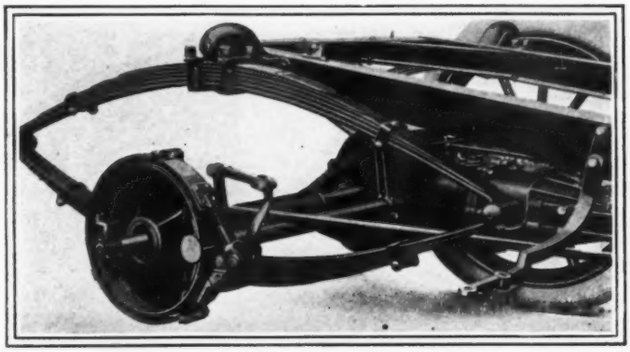

Fig. 6—R-C-H spring suspension and rear axle

these costs have been derived from the first set of curves.

In computing costs per ton-mile it is assumed that vehicles are fully loaded half the total daily distance traveled, or, what is equivalent, that vehicles carry half their rated capacity load the full distance. If they carry more than this the costs per ton-mile would be correspondingly reduced below the figures of the curves. For instance, with full load the entire distance, the cost per unit of work would be reduced almost one-half. I say "almost" because depreciation, repairs and renewals and fuel per loaded mile are somewhat greater than per dead mile.

A study of these curves reveals the large *reduction in cost per unit of work by increasing daily performance* as follows:

Increas'g daily mileage		Reduction in cost, per cent.			
From	To	3-ton	5-ton	7-ton	12½-ton train
10	20	44	44	44	44
20	30	25	20	21	20
30	40	17	17	12	11
40	50	14	14	10	10
50	60	10	8	8	9
60	70	7	6	4	5
70	100	12	8	11	10
40	100	38	32	30	30

In other words, increasing the daily work from 10 miles daily average to 20 reduces the cost per ton-mile, or per unit of work, 44 per cent. in all cases. Then increasing the daily work to 30 miles another reduction of 20 to 25 per cent. in cost per unit of work is effected. And increasing from 30 to 40 miles per day 11 to 17 per cent. reduction in cost is effected. Substantial gains in economy are made by further increase in daily mileage; increasing from 40 to 100 miles per day, for instance, effects a reduction of 30 to 38 per cent. in cost per unit of work.

Value of Proper Routing

THESE curves are impressive as indicating the economies to be effected by proper routing of vehicles for maximum daily work. The costs, as above mentioned (being based on loads one way only), can be very materially reduced if merchandise or material can also be carried over some of the "dead-mileage" assumed in these computations.

The approximate parallelism of the curves indicates that whether light trucks, heavy trucks, or trucks and trailers are employed, economy increases with increased daily mileage at about the same rate with all these sizes of units.

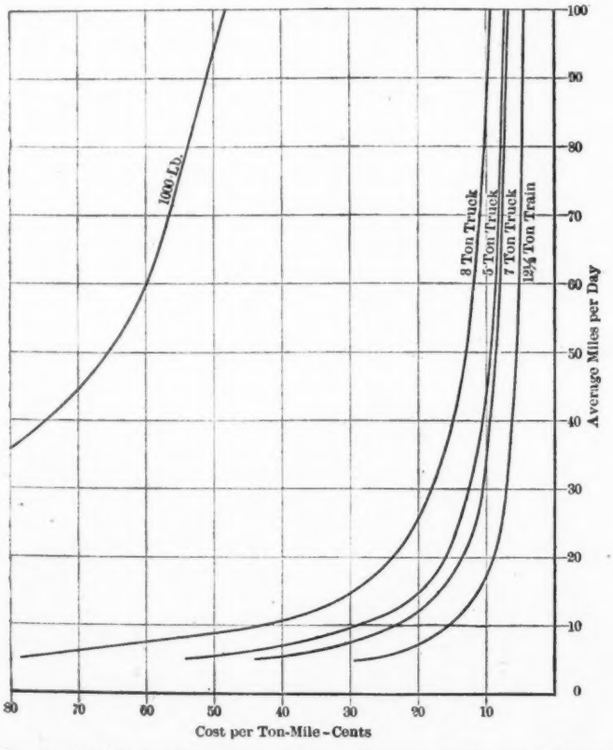

Fig. 2—Illustrating the comparative cost per ton mile for different sizes of units for varying daily mileages

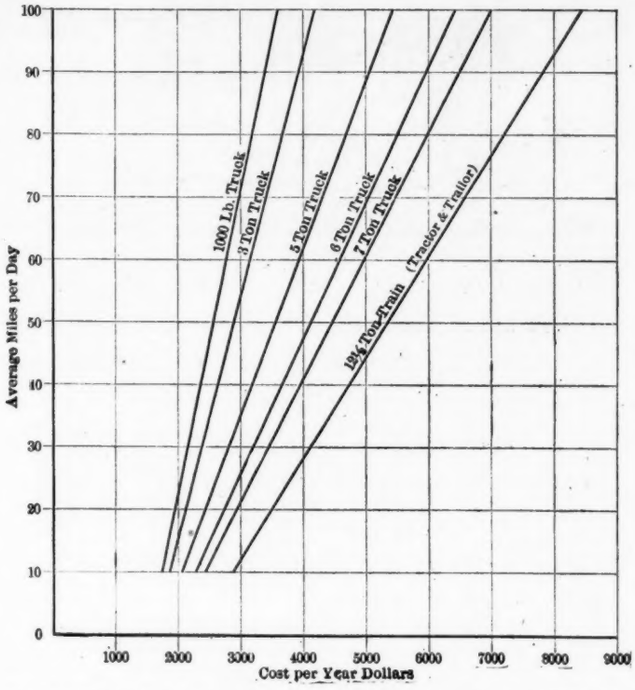

Fig. 1—Illustrating comparative actual hauling costs for different sizes of units for varying daily mileages

These curves are also of interest and assistance in studying the question of sizes of units to be used for any particular class of work. They show, for instance, that a 12 1-2-ton train (7-ton truck with 5 1-2-ton trailer), operating 70 miles per day and loaded only one way, will carry 1 ton of load 1 mile for 5 cents, whereas the same 1 ton carried 1 mile in smaller units operating 70 miles per day would cost 10 3-4 cents on 3-ton, 8 cents on 5-ton and 7 1-2 cents on 7-ton units; thus indicating the tremendous advantage of using large capacity units and trailers.

They show also, for instance, that the same economy, viz., 10 cents per ton-mile, is obtained by operating a 3-ton truck 84 miles, a 5-ton truck 44 miles, a 7-ton truck 35 miles, or a 12 1-2-ton train only 18 miles per day.

The proper routing of heavy transfer units and of lighter distributing units, the adoption of correct sizes of units for such service, or for pure straight haul service, the proper load handling facilities, are all problems which frequently require careful study, always with an eye to the practical conditions of each particular service, to obtain maximum efficiency and economy.

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Carbureters for Kerosene—While designers in England and on the continent of Europe have lately turned out several carbureters intended for use with kerosene as a fuel or to be installed for emergency purposes or economy in cars also equipped with a gasoline carbureter, it is admitted that the fuel consumption with these devices is still so much larger than with the best gasoline carbureters that the economical advantage in using the cheaper fuel is wiped out. The difference in the consumption is due to the greater difficulty in vaporizing the kerosene and is not, as in the case of alcohol, an inherent shortcoming in the fuel; on the contrary kerosene exceeds gasoline in heat value, and correspondingly favorable results may be expected eventually if experiments are continued. This was the gist, for example, of a lecture delivered before the Institution of Automobile Engineers in London by Messrs. W. Morgan and Wood with special reference to a kerosene carbureter designed by G. Constantinesco of Rumania.—From *Auto-Technik*, May 24.

Motor Overheats Badly; Does Not Believe in Water Jackets; Minimum Fuel Consumption Under Different Circumstances; Repairing Oakland Clutch; Care of Locomobile Low-Tension Ignition System; How to Reach the Cadillaqua from Wheeling

Regards His Case as Hopeless

EDITOR THE AUTOMOBILE:—I have a Flanders 20, two-speed gearset. It has been overhauled, the cylinders cleaned and the crankcase has been cleaned out. It has a 4-inch spark advance at most. I have tried all kinds of carbureter adjustments and all kinds of timing. I have polished the combustion chamber; tried all kinds of lubrication and lubricants; put on air valve; ground the eight poppet valves and have done all that I know or ever heard of.

The motor will heat up to boiling point in running 1-2 mile and loses power after it has run about 10 minutes in spite of all my care. At first it works finely and while cold pulls strongly. What should I do?

Chapanoke, N. C. JOSEPH TOWE.

—You have apparently overlooked the very first thing that should have been done. That is to clean out the radiator. A scale gathers on the radiator that will cut down its efficiency to a remarkable degree unless cleaned out. If the water is hard, as it is very likely to be in North Carolina, the deposit of lime would impair the radiator efficiency so much that the trouble you encounter is only to be expected. The cure is as follows: Secure a large wash boiler and put in about 10 gallons of water. Bring the water to a boil and add twenty handfuls of washing soda. Stir this up until it is well dissolved and allow it to drain through the radiator. When there is just enough left in the boiler to fill the radiator, fill it up. Keep the drain cock closed, put on the cap and start the motor. Allow it to run for 2 or 3 minutes; stop it and drain out the water. Flush out, with rain water if possible, or, if not, use the purest water you can get. After this, refill the radiator and there should be an improvement in the running.

You do not mention if the water pump is working satisfactorily. Examine this also. Other causes for your trouble are: bad valve timing, magneto timing, dragging brakes and bad oil feed. In connection with the latter it would be advisable to fill the crankcase until the motor smokes and then see if it runs without heating. If it does you have found your trouble.

Criticises Engineering Practice

Editor THE AUTOMOBILE:—I would like to enter upon a discussion with your readers upon some points which may be quite a matter of course, but which are not clear to me. For what reason are means for cooling gas engine cylinders resorted to? What sound reason is there for their present use when it appears that an engine will work better without them? To be more specific: My engine is conventional, being of the horizontal type designed to run on city gas. It is waterjacketed, but I have run it for 2 months without any water; and, what is more, I intend putting an asbestos jacket around the cylinder since it is not hot enough to suit me.

To come back to the question: Why a waterjacket? Is not the engine a heat engine? Is not the driving power the difference in potential between the heat at the time of the explosion and the surrounding air? Why lower the temperature of the cylinder? There must be a reason for the present use of the waterjacket, since engineers persist in keeping it, but we must admit that fashion dominates engineering as much as women's hats. Still, I believe that running an engine as above stated brings up a question which is worthy of serious consideration from the designers. What is the answer of the technical fraternity?

The present temperature of the motor I cannot state. It is sufficient to melt babbitt and yet I am tempted to believe that I can nearly double it. The oiling is very good, less oil than usual being required. The compression is excellent, being probably about 80 pounds, and what I use for fuel is immaterial. It has been stated by authorities that an increase in efficiency is practically impossible in a gas engine. Does not the above refute this? The losses in the waterjacket have been given as a result of tests not less than 33 per cent; would they be in this case?

I have also noted that the highest compression pressure is obtained at the rear dead center only when running at very low speed and that at all other times the compression maximum wave is considerably behind the piston speed. This would indicate that all our high-speed engines at the present day are radically wrong. What have our designers to say to that? Will some of them be good enough to verify my statement? I think it is a discussion of great value to the industry. One more: Some makers claim that they can inject water into the cylinder for cooling purposes, this water forming steam; I have been unable to duplicate this; it will leave as water. What is the answer?

New York City. P. G. TISMER.

Speed Affects Fuel Consumption

Editor THE AUTOMOBILE:—Will you answer the following questions and clear up a controversy between our local automobile men?

(1) Given a 20-mile stretch of level road, will an automobile consume more gasoline if driven over it in 55 minutes than if driven over it in 30 minutes?

(2) Given a stretch of road of the same length in hilly country, uphill and down being about equally divided, so that it would be possible to coast part of the time, would more gasoline be consumed in 55 minutes than in 30 minutes?

The latter question, you will see, brings in the question whether the open throttle, as would be required for quick work up and down hill, would be offset by the shutting of the throttle when coasting down the hills.

Bridgeton, N. S. W. A. WARREN.

(1) Assuming that the carbureter on the car is adjusted for ordinary touring, its speed of best economy would be about 25 miles an hour, as was explained in THE AUTOMOBILE of June 27, page 1487. If the distance was covered in 55 minutes, the speed would be about 22 miles an hour, which is very close to this; while 30 minutes would mean a speed of 40 miles an hour. The best economy would be obtained in the 55-minute run.

(2) This question resolves itself simply to one of climbing 10 miles of hill. The best economy would be secured when the car

was allowed to coast down the hills with the motor stopped; that is, with the switch turned off and clutch out. You do not state whether the hills can be taken on high gear. If they can by rushing them at the bottom this would be the most economical way. The slope of the hills would affect this, as if they were steep the rushing of the next up-hill could be done by simply allowing the car to coast with the brakes off. In other words, the most economical speed would be that in which the least gear-changing is done, and considering the amount of rushing that would have to be done, the speed would probably be nearer that in which the course is covered in 30 minutes.

Care of a Low-Tension System

Editor THE AUTOMOBILE:—I have an old Locomobile car with a low-tension ignition system. I have just bought this car second-hand and would like to have the ignition system explained to me.

Paducah, Ky. READER.

—The accompanying illustration showns the system so clearly that very little explanation is needed. The upper end of the tappet rod T is hooked onto the end of the hammer lever H. As the tappet rod is given vertical motion by one of the cams on the camshaft C-C, a hammer comes in contact with the anvil A and stays there until the cam has reached such a position that the tappet rod suddenly falls, causing the hammer to separate sharply from the anvil and the spark to occur. This action is assisted by a strong inclosed spring S1 at the bottom of the tappet rod. It will be noticed that there is a spring S at the top of the tappet rod, the purpose of which is to maintain enough pressure on the end of the hammer lever to keep the electrode in contact until it is time for the break to occur.

The hammer, or moving electrode, has a conical bearing through the igniter plate so that the pressure inside the cylinder forces the hammer bearing tightly against its conical seat and prevents any escape of gas at this point. The igniter plug, or anvil, is the fixed electrode and is made a solid unit. It has a taper fit through the igniter plate, being drawn up and held on the outside by a hexagonal nut. The insulation of the anvil consists of mica, compressed and highly polished, knife-blade switches K form electrical contact between an insulated bus-bar B B and the anvils, the copper jaws of the switches being secured to the insulated portion of the anvils outside the cylinders.

The important things to consider in the maintenance of the ignition system are the igniters. If an unnecessary amount of lubricating oil is continually fed to the motor the ignition will eventually become foul and irregular operation, or even a short-circuit, may result. Therefore do not give the motor too much oil and make it a point when the valve covers have been removed to inspect the igniters and clean them if they are foul. If suitable oil is fed to the motor in the proper quantity, not only will the lubrication be thoroughly adequate, but the igniters will be clean and thus will not require much attention.

When the car is inspected, it is well to look over the wiring and see that all terminals are in proper order and that the knife-blade switches K are making proper contact with the copper jaws A. The latter should be kept clean and pinched together. Keep the hard-rubber handles on top of the switches screwed down tightly.

Wants S. A. E. Horsepower Rating

Editor THE AUTOMOBILE:—Can you give me the S. A. E. rating of the new Hupmobile 32 which has a bore of 3 1-4 inches and a stroke of 5 1-2 inches?

Hop Bottom, Pa. S. E. MILLER.

—The S. A. E. rating of this car is 16.9 according to the formula $\frac{D^2N}{2.5}$, in which D is the cylinder bore; N the number of cylinders and 2.5 a constant which approximates the 2.489 evolved by the S. A. E. This constant takes into consideration an average piston speed of 1,000 feet per minute and an engine efficiency of 75 per cent. between indicated and brake horsepower. On a long-stroke motor this rating underestimates the power.

To Cadillaqua by Automobile

Editor THE AUTOMOBILE:—Several of my motoring friends and myself intend to make the tour to Detroit from Wheeling to see the Cadillaqua, which is to be held there in July. I understand that this will be the gathering place for numerous motorists from all parts of the country. In consideration of this I would like a synopsis of the route. Can THE AUTOMOBILE help me in this?

Wheeling, W. Va. G. A. TUCK.

—The first part of the route takes you from Wheeling to Canton; the distance is 85.8 miles, and the roads, which traverse through hilly country and abound in beautiful scenery, are for the most part of good macadam. As far as Steubenville they are of natural dirt and very good in dry weather.

Set your indicator at zero at Twelfth and Market streets, Wheeling. Start on North Market street with trolley and at Tenth street turn to left, crossing the long stone toll bridge, after which proceed to diagonal four-corners, then over the long iron toll bridge into Bridgeport. Follow trolley out Zane street, then turn under trolley and cross railroad tracks at reading of 4.6 miles. At the end of the road turn along railroad tracks, passing beneath them and crossing trolley at 4.9 miles. Taking the right road and leaving the toll gate at the left, and passing again

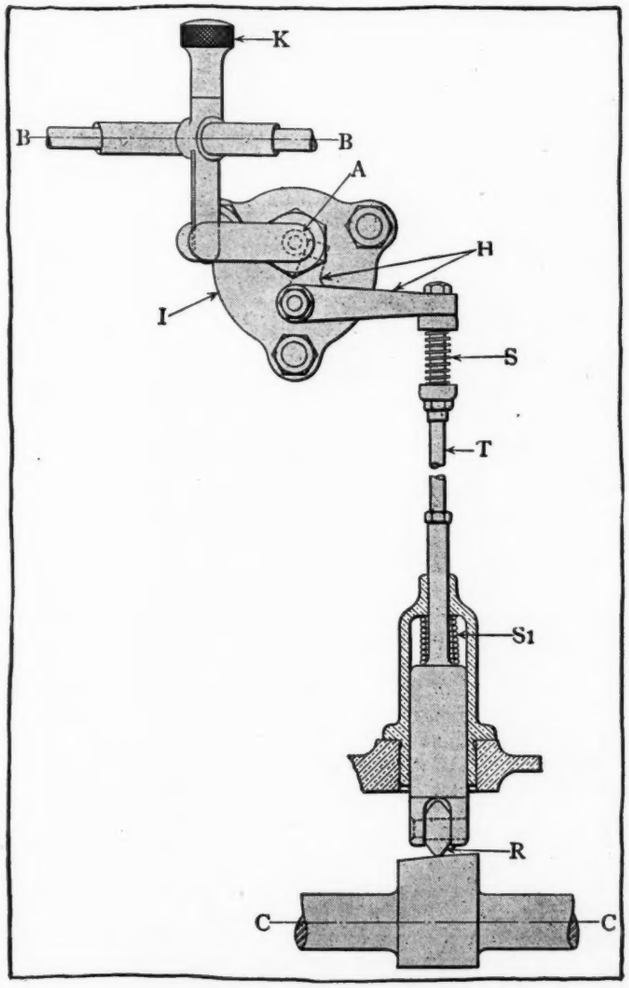

Fig. 1—Illustrating the low-tension ignition system used on Locomobile cars previous to the year 1911

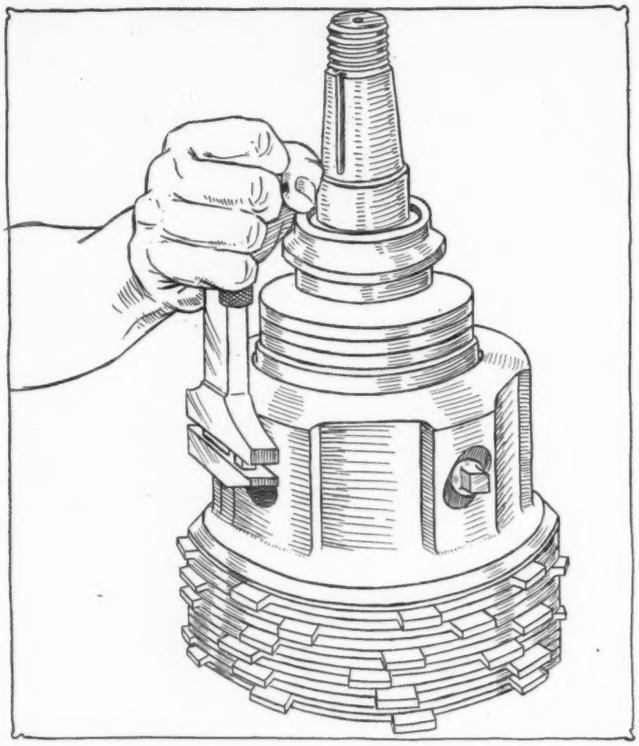

Fig. 2—Taking down the Oakland multiple-disk clutch; first step in operation

under the railroad at 5.5 miles, crossing it 5.6, turn along the river bank and follow it to 8.7 miles, where you turn left with the road. At 8.9 take right road, turning across the tracks at 9.5 and at the end of the road turn left into Rayland. Cross the long iron bridge, taking first right road at 10.4. At 10.9 take the right road just before the upgrade, turning to the right under the railroad and then immediately to the left until you turn to the right again at 11.1, after which cross the railroad, passing through Warrentown.

Follow the left road, turning left at 11.5, passing along the river bank and turning right at 13.2. Turn left with road after crossing one railroad and running under another, then turn sharp right at 13.6 and run along tracks. Follow lines of main travel through Brilliant and then along trolley to Steubenville. Out Market street through Wintersville, Richmond, along line of main travel through East Springfield, Amsterdam, Harlem, Carrolton, New Harrisburg, straight through Morges Corners, Magnolia, Industry and with trolley into Canton.

The road from Akron to Elyria is macadam almost all the way. It is easy to follow and takes in a distance of 41.6 miles. Start west out Market street with trolley, pass through Smith's Corners, Medina, Mallet Creek, Erhart and then straight through to Grafton, picking up the trolley to Elyria. Route is now from Elyria to Toledo on good gravel and stone roads. Pass out Middle avenue passing City Hall running into College avenue, Oberlin. Go straight on through Townsend, following Townsend avenue to Main street and thence to Norwalk. Through on West Main street to Monroeville and out Monroe street to Bellevue, following lines of main travel through Clyde, Fremont and Woodville, being careful not to take Fort Wayne route here. Follow signs and local direction into Toledo. From Toledo to Detroit there are two routes. The shorter road is bad, so the longer is here given. The distance is 76.3 miles over gravel and stone roads. Leave Toledo by going north on Madison avenue, then out Collinswood avenue, through Detroit avenue, keeping straight ahead where trolley leaves to the left, and pass under railroad. After striking Erie pick up trolley and follow through La Salle, Monroe and leaving it for road through Old Port. Pick up trolley again at Trenton and following along brick pavement to Wyandotte and Ford City. Then follow trolley line straight into Detroit.

Trouble with Multiple-Disk

Editor THE AUTOMOBILE:—I am having trouble with the multiple-disk clutch on my Oakland 30 runabout. It slips. Can THE AUTOMOBILE tell me how this can be overcome?

It seems that when I put kerosene in the housing, the clutch will grab severely, if I give it oil it slips and if I do not oil it I am afraid it will wear. Have tried several grades of good oil with the same result. Clutch spring is down to last notch.

Muscatine, Iowa. C. E. GRAETNER.

—In the first place, it is important that you should know that there is a passage from the gearset housing to the clutch through which the lubricant is free to pass. The grade of oil in the clutch and gearset should therefore be the same. The best lubricant to use is a medium grade of cylinder oil.

To cure the slipping and grabbing troubles, disassemble the clutch by removing the screws shown in Fig. 2. The clutch can then be taken apart by lifting the various units off the shaft. Be careful not to separate the plates. Keep them in one pile in the same order in which they were taken off. The clutch collar is placed in a vise and the face between the jaw is filed down so that the collar fits tightly against the clutch sleeve support. This is the part against which the collar illustrated in Fig. 4 fits. After having filed this down for some distance, slip the collar over the shaft and see how far it goes down. If there is not gap between the collar and the sleeve support it will be right. In order to make this fit tightly, it may be necessary to file down the boss on the shaft. This can be determined after an attempt is made to close the gap between the collar and the sleeve support by filing as indicated in Fig. 4.

This gap may be closed by other methods. The shaft itself can be turned down so that the collar will slip down further. This requires an extensive machine shop to carry it out, as does a third method which consists in counter-boring to a greater depth the center of the clutch collar.

It would probably be advisable for you to also cut off two or three turns in the clutch spring. These should be cut from the front end of the spring and this should then be securely refastened. This puts a greatly added tension on the spring and will stop slipping tendencies to a great degree.

Finally, before reassembling the clutch, take the top plate and the lowest plate. These are both brass. Slot them with a hacksaw as shown in Fig. 3. This will permit the oil to pass

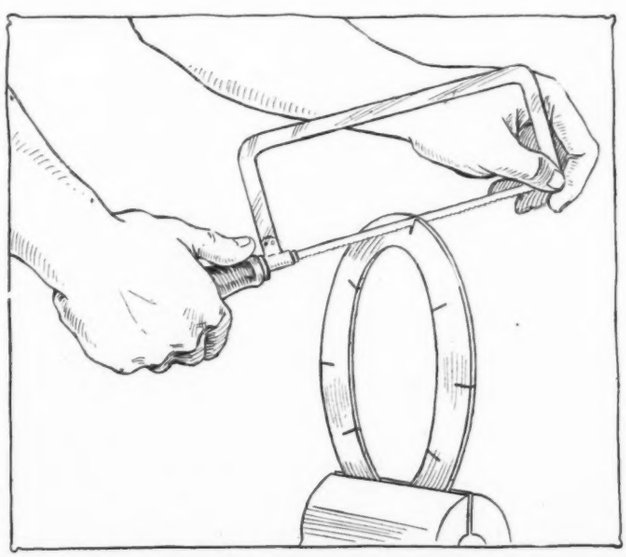

Fig. 3—Cutting the outside brass ring to permit of a flow of oil through clutch

freely through the clutch. If these directions are closely followed out the clutch may be put in prime condition and the repair will be practically permanent.

Constructing a Racing Motor

Editor THE AUTOMOBILE:—I wish to have further information regarding questions answered by you in the issue of May 23.

(1) The four and six-cylinder motors I am constructing have a bore of 4 5-32 inches and a stroke of 5 1-2 inches. Is this a good ratio for racing purposes?

(2) The valves have a diameter of 2 3-16 inches, opening with a lift of 7 1-6 inch. Is this opening large enough or too large, and is the lift high enough or too high?

(3) The cams are made to time the motor with inlet to open 15 degrees past top dead center and close 35 degrees past bottom center. The exhaust opens 52 degrees before bottom dead center and closes 5 degrees past upper dead center. Would you consider this timing right, considering the valve opening and lift? If not, state how many degrees different from any of the above you would recommend, as you say that quite a few motors overlap the valves; that is, have the intake open about center and the exhaust 10 degrees past, therefore having an overlap of 10 degrees. Also note that some motors close their inlets as late as 60 degrees after bottom dead center and open their exhaust before the bottom center. Would there be any advantage in opening the exhaust earlier, closing the inlet later and overlapping the inlet after the exhaust?

(4) Lubrication is by splash. The oil being fed to the trough and then scooped up by the connecting-rod as it passes on each, and under these conditions, would oil holes in the pistons be advantageous? If so, why?

(5) The flywheel with the clutch when finished weighed 113 pounds. It is 18 inches in diameter, and is fitted with aluminum cone, leather faced. Is this too much weight for either the four- or six-cylinder; if so, state what each should be. I am cutting the four-cylinder 5 pounds and the six-cylinder 10 pounds from the 113-pound weight, leaving the diameter the same.

(6) The four-cylinder car will weigh 2,350 pounds and the six-cylinder 2,750 pounds. I figure 32-inch wheels for the four-cylinder with 4-inch tires and 34-inch wheels with 4 1-2-inch tires for the six-cylinder one. Would you consider this right?

(7) The length of the connecting-rods is 10 3-4 inches from center to center. This, I understand, is a little shorter than average practice. But I have not room in the base for a longer one. Is it any disadvantage? The car I built worked satisfactorily on the road with these rods.

(8) The compression is 85 pounds, which I consider high and should be an advantage. If not right, should it be higher or lower?

(9) How fast should these engines turn over to be considered a good, safe speed for racing so that I can determine the gear ratio suited to the speed desired?

(10) Are cast-iron flywheels safe for high speeds, and at how many revolutions do they reach their limit of safety? Should I use a cast-steel flywheel, and how much would this increase the safety limit?

York, Pa. J. PIERCE.

—(1) According to your figures you would have a bore-stroke ratio of 1.132, which would be very satisfactory for racing purposes. The piston speed in this case at 2,000 revolutions per minute would be 1,833 feet per minute, which is common on racing cars.

(2) Your valve dimensions are good, but a lift of 1-2 inch would be better, remembering the short time for gas flow.

(3) The valve timing is largely a matter of cam shape in a racing car. Square cams should be used in order to give the valves a quick opening and closing, and it would be well to increase the strength of the valve springs slightly so as to make the action more positive. That is to obviate any danger of the follower not having speed enough to follow the cam. An increase of 5 pounds to the inch compression would make the springs about right. The timing for a racing car is largely a matter of personal opinion. Expert opinion, however, seems to run along the following lines: In terms of piston travel, inlet should open 1-8 inch after top dead center and close 1-4 inch above bottom dead center. Exhaust open 1-4 inch above bottom dead center and close 1-4 inch after top center, giving the inlet opening a lead of 1-8 inch over exhaust closing.

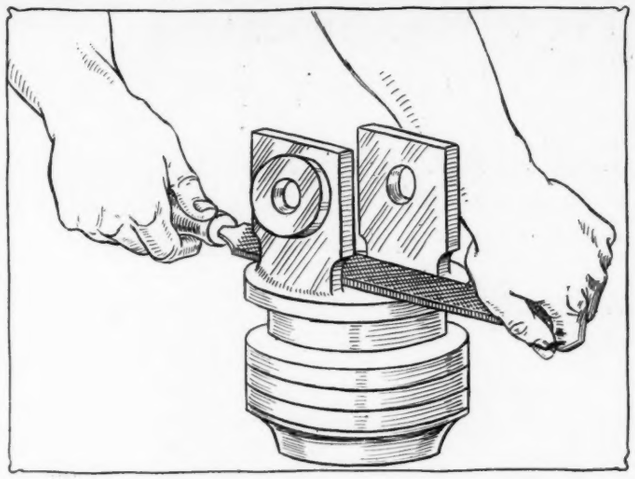

Fig. 4—Filing clutch collar to make it fit tightly against sleeve support

(4) Try motor without oil holes in piston. If it smokes cut them in so that oil will not be sucked into the combustion space, the idea being that only the oil above the holes could be sucked into the combustion space past the piston on the suction stroke, the air being sucked up from the crankcase through these holes instead of around the pistons.

(5) Flywheel can be cut down in weight to 90 pounds on the four-cylinder motor and 110 pounds on the six-cylinder. In each case the diameter would be, with these weights, 22 inches. With the diameter 18 inches, as you have it, the weights you suggest would be all right.

(6) Wheels, weight and tire sizes are correct.

(7) The connecting-rods are too short. This puts too much side thrust on the pistons and cuts down the efficiency of the motor on account of the added friction and angularity. The correct length would be 14 inches with a stroke of 5 1-2 inches.

(8) The compression could be made higher in a racing car, where every ounce of power is needed. From 90 to 95 pounds would be all right with a high-speed motor; 90 would give very satisfactory results all around.

(9) Two thousand revolutions per minute is good; 2,500 is the outside limit; 2,000 revolutions per minute would give you a piston speed of 1,833 feet per minute, which is as high as you will be able to go. To get this, all moving parts must be of the best material, light but strong.

(10) Use a steel flywheel. Cast iron is safe for all ordinary speeds unless there is a blowhole in the casting. A bubble may not be found by inspection, but would evidence itself by allowing the flywheel to burst at high speeds. The speed at which the flywheel will burst is that at which the centrifugal force equals the tensile strength. This depends on the weight, diameter and speed of the flywheel and is easily figured.

[THE AUTOMOBILE is holding a few queries and communications which have been received unsigned. If a correspondent does not wish his name published it is merely necessary to state this fact in the letter and a nom de plume will be substituted. As an evidence of good faith, however, it is required that all communications be signed. Those which have been received up to date will be held until the identity of the sender is known. All communications will be answered strictly in the order in which they are received.—EDITOR.]

New Reciprocating Sleeve Valve Motor

Inventor Brings Out Novel Engine with Exterior Valves Driven by Vertical Shafts and Connecting-Rods

Accessibility, Ease of Lubrication and Low Working Temperature the Chief Claims

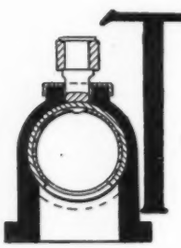

Fig. 1—Cross-section of valve

THAT inventors are still hard at work evolving new and original ideas on the sleeve valve motor is well illustrated by the latest development in this field which has been brought out by Denis P. J. Burguieres, a New Orleans sugar manufacturer, who has made himself known in that field by a number of useful inventions in sugar machinery. The distinguishing feature of this motor is that the sleeve valve is distinct and separate from the rest of the motor, thereby allowing the working parts to be operated at a lower temperature than if they were in closer proximity to the heat of the combustion chamber. In appearance, the valve is a long cylinder. Each cylinder is about the length of a block of two motor cylinders. There are four of these for a four-cylinder motor, two for each pair of cylinders, one on the exhaust side and the other on the intake side. Outside of the valves and their driving mechanism, there are no departures from standard practice in motor construction.

The valve consists of three main parts, a casing, an inner sleeve and an outer sleeve. The casing is attached to the outside of the motor cylinder as shown in the plan view, Fig. 4. The inner and outer sleeves are the two cylinders shown in the same illustration, the slotted sleeve being the inner or stationary sleeve, while the other sleeve, the lower in the illustration, moves with a reciprocating motion between the casing and the inner sleeve. The ports in the casing of the valve register with the ports in the cylinder so that there is always communication between these two. The port on the inner or stationary sleeve also registers with the cylinder and casing openings so that, were not the intermediate, or moving, sleeve between the inner sleeve and the casing there would be a free passage from the motor cylinder into the valve passage. The intermediate or sliding sleeve is also slotted, as may be seen in Fig. 4. It is shorter than the stationary sleeve and is therefore capable of a reciprocating motion. When the port in the center, or moving, sleeve registers with the openings in the casing and inner sleeve, the gas has a free flow from the center out into the valve passage and to the exhaust manifold.

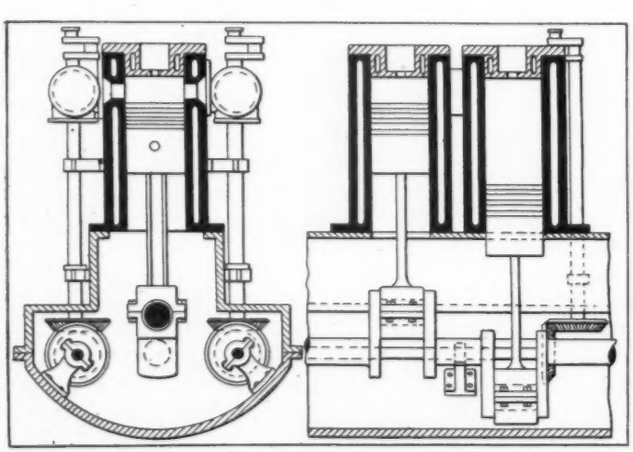

Fig. 2—Transverse and longitudinal section through motor

There is no possibility for leakage of compression past the sleeves for two reasons. In the first place, the gas, in order to escape from the cylinder when the ports are not in line, would have to pass between the sliding or center sleeve and the casing through the port in the center sleeve and then, to get through the opening in the inner sleeve, would have to come back between the inner and center sleeves to the opening in the latter. The natural inclination of the gas is against following a tortuous passage of this description so that there should be no leakage. Balance is secured by an annular fillet which passes around the interior of the casing. This fillet is filled with the gas at the time of exhaust and is intended to maintain an equal pressure all around the sleeves. Balance has been found to be one of the troubles which beset the rotary valve makers who mount their valves in much the same way, but who depend on a rotating motion in place of the reciprocating motion suggested in a motor of this type.

The drive is effected in a manner new to sleeve valve motors. A study of Figs. 2, 3 and 4 will show how this is carried out. Two shafts run the length of the crankcase, as shown in Fig. 2, one on either side. These are driven directly off the crankshaft by spiral gearing or any other method which may be desired by the manufacturer. From the center of this shaft between the two center cylinders a vertical shaft is carried up to the top of the motor terminating in a crank, which may be seen in Figs. 2, 3 and 4. Upon these two cranks are mounted a pair of connecting-rods, one for each valve. A slot is made in the casing so that the drive may be communicated to the center sliding sleeve and, to prevent a leak through the connection of the connecting-rods and the center sleeves, a cover is put over the slots. The cover slides in a guide along the top of the casing, making a neat and compact joint with little frictional loss and having but little weight.

Lubrication and Cooling Systems

Lubrication of the sleeve valve is taken care of by grease cups In Fig. 1 the method employed in mounting these is shown. The cup is filled with light grease and is of the common compression type. The passage of the lubricant is through the opening in the casing and down on to the reciprocating sleeve. The oil is distributed about this sleeve by the grooves or ducts depicted in Fig. 4. By the action of these ducts and the reciprocating motion of the sleeve itself the oil is spread over the surface of the metal and the required film of lubricant is formed. There is practically no leakage of lubricant as the end caps of the cylindrical casing fit tightly against the ends of the stationary spring sleeve, Fig. 3. This tightness of the ends fills the two purposes of preventing leakage of gas or oil and at the same time prevents any endwise movement of the stationary sleeve. This method renders the lubrication of the sleeve altogether independent of the regular lubricating system of the motor. If desired, however, this could be departed from and it would seem that it would be an advantage in the case of a motor with a force-feed system to run a lead directly to the sleeve valve, making this part of the lubrication positive and independent of the driver's forgetfulness to turn down the grease cup.

Cooling the valve would depend upon its position. Should it be on the side of the motor, as shown in the accompanying illustrations, it would seem that cooling ribs at least on the casing would be an advantage or if brought in closer to the cylinder a waterjacket could be easily run around the casing. Expansion of the cylinders should not destroy the fit as the inner sleeve is sprung into the reciprocating sleeve by compressing it against the slot which runs its entire length. This spring action should com-

pensate for wear as well as for expansion. The method of cooling, however, would depend entirely on the position of the valves, which are of such construction that they can be placed almost anywhere the designer chooses to put them.

The claims made by the inventor are principally in the form of claiming the superiority of the outside sleeve motor over the inside sleeve type in that greater accessibility is secured, lubrication is simpler, on account of the position of the sleeves, and the fact that they work at a lower temperature than those having inside sleeves. It is also claimed that the moving parts are fewer and hence frictional losses are less. A fact which is of special significance is that the inventor claims fewer parts by half than are used in the construction of a poppet valve motor. This has been the tendency in all the latter designs of sleeve and rotary valve motor. The cutting down of the number of parts is drawing attention after years of insistance on the part of manufacturers for a simpler motor.

High Efficiency and Accessibility

The efficiency of the motor is claimed to be as high as that of any of the motors of the sliding sleeve type and a gain might be expected from the fact that the sleeves are of smaller diameter and hence give less chance for losses of power through the friction caused by the expansion of the sleeves. The advantages which are set forth above, it is claimed, would also tend to reduce power losses and to render the motor more efficient.

Repairs on the sleeves are declared to be more easily made than on the inside sleeve type because all that is necessary to disassemble the sleeves is the removal of the two end covers which are simply screwed in place. The connecting-rods are then detached by removing the bolts which hold them in place. After this is done, the sleeves can be drawn out. This renders cleaning and inspection easy. The reassambling job is also very simple. The inner sleeve is first sprung into the working sleeve and the two are then put together into the casing. When the inner sleeve is placed in the sliding one, the ports are lined up so that they will be in the correct position when they are put back into the housing. It is impossible for the ports to get out of line when the sleeves are once in position owing to the fact that the bolts from the connecting-rods which drive the sleeves pass through slots in the different parts. The slots act as guides and hold the sleeves in the correct relative position to the casing.

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An Angel on Ball Bearings

When the famous *Campanile di San Marco* in Venice collapsed about ten years ago it was decided to rebuild it "where it had stood and as it had stood," and this work of restoration has now been concluded, but while the tower stands to all appearances just as it was before, the construction methods which were employed in its reproduction were altogether modern and calculated to make it better able to resist storms, fire and earthquakes. Only a few parts of the old tower were used over again, but among these was the Marcus Angel, which for centuries had adorned the summit of the tower, and in replacing this image whose very large wings used to catch the full force of the wind, making the tower to sway and vibrate, it was decided to make use of ball-bearings for the purpose of obviating this evil. It was in fact a concern closely identified with the automobile industry in whose charge the design of this feature was left. The image is made of hammered copper sheets covered with gold leaf and weighs 1200 kilograms. In securing this considerable weight to the extreme top of the tower by means of an internal scaffolding, it was the object to permit the image to turn like a weathercock, so as to always present the smallest possible surface to the wind, and also to permit it to sway a few degrees in any direction independently of the tower and thereby cushioning the wind stress upon the latter. An end-thrust ball-bearing was secured in the scaffolding at the height of the angel's chest and from the upper one of its disks there was hung a long flexible rod passing down through the pedestal of the figure, with some side play, and supporting at its lower end, inside of the tower, a counterweight of 100 kilograms. Inside of the pedestal, which was bolted to the tower, there was secured a semi-spherical ball race containing a cage with sockets for 64 balls of 1⅜-inch diameter, and with an opening for passing the counterweight rod, and to the bottom of the scaffolding the other semi-spherical member of this bearing was securely fastened. In order to withstand the effects of dust and of the salty air of Venice without any attention whatever the bearings and balls are made of a special bronze in dimensions giving a large factor of safety, are packed in graphite paste, to serve as lubricant for perhaps a thousand years, and the whole mechanism is tightly encased to prevent all ingress of impurities, such as otherwise might be caused by the visits of birds, and also to prevent the wind from gradually blowing the lubricant away.—From *Werkstattstechnik*, June 15.

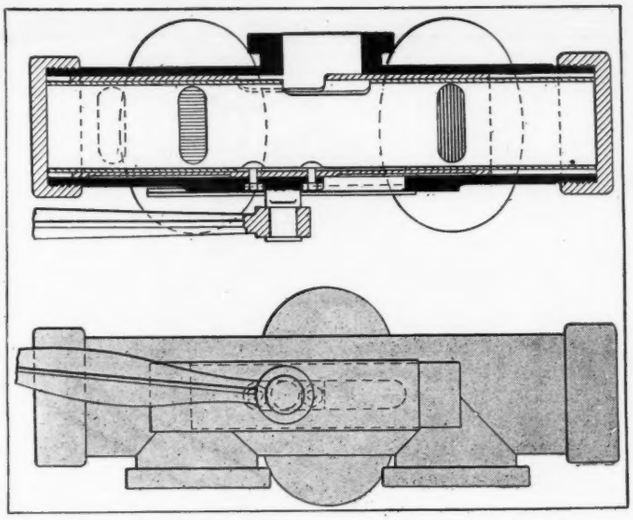


Fig. 3—Sectional and exterior view of assembled valve

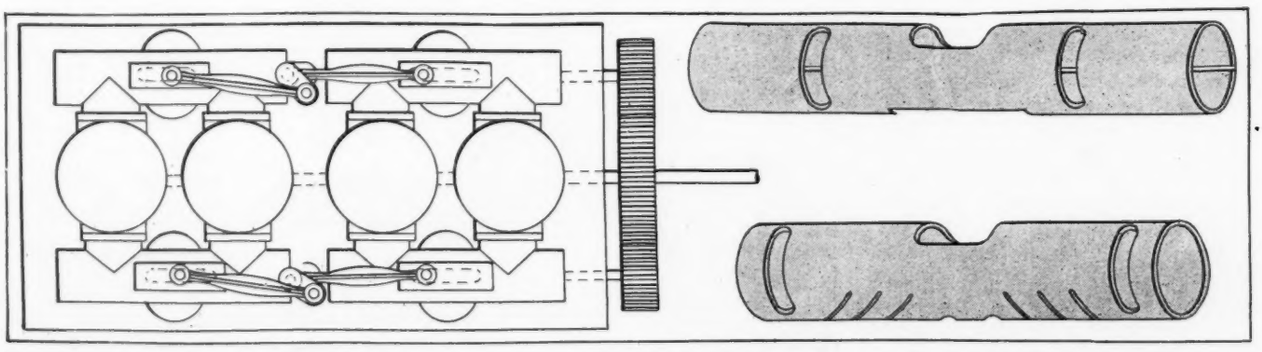
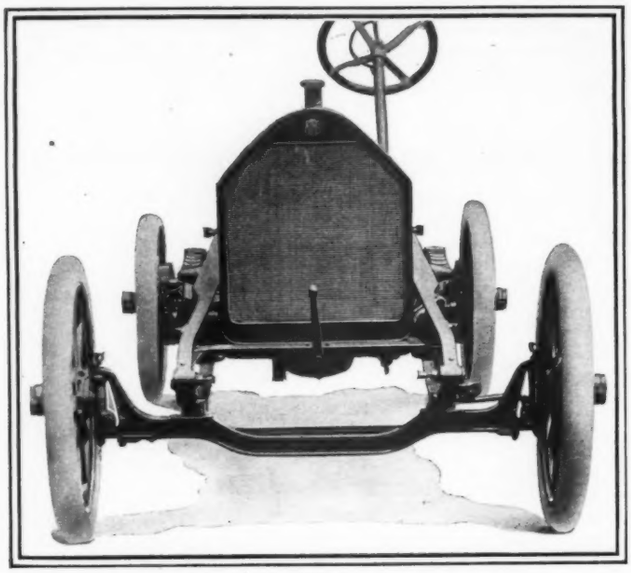


Fig. 4—Plan view of Burgulieres sleeve valve motor. The long stationary and the short reciprocating sleeve are also shown



Front view of 1913 King 36 roadster chassis

King 36 Roadster

New Type of Body Features This Latest Addition to Company's Line

Rear Deck Compartment for Tires and Baggage—Long-Stroke Motor and King Patent Lubrication System

AMONG the cars which have recently made their initial appearance is the King 36-horsepower roadster, which, while possessing all the mechanical features characterizing the product of the King Motor Car Company, is of an entirely new body type, designed by Charles B. King.

The car, which has a 110-inch wheelbase, has very graceful and pleasing body lines. There is a rear deck compartment which incloses the extra tires and is intended to carry all necessary baggage as well. A glance at the illustration will show how this rear compartment idea has been carried out without causing the back of the machine to present a bulky appearance. The running-boards are free from tanks and boxes, a tendency which is fast becoming law to body designers. The doors latch from the inside, closing flush with the sides of the body. The cowl is on a very low slope and it is surmounted with a windshield which is a part of the standard equipment.

Another feature is the setting of the radiator and power plant 8 inches back of the center line of the front axle. This is done with the idea of giving better load distribution and of adding to the attractiveness of the car's lines. The road clearance has been made 10 inches, but at the same time the body is hung low to lend a rakish effect to the whole.

The car in every way conforms to the King construction, the peculiar rear spring design being perhaps the most original and distinctive feature. The front springs are of the ordinary semi-elliptic type, but the rear ones, which are specially long and flat, are mounted in the reverse manner from that in which they are placed on the average car. They are supported at their centers on pivots which are fastened to the frame, and at their front ends they are also fixed to the frame. The rear ends operate in shackles which are mounted on the rear axle. With this construction it is claimed that the shocks received in passing over rough places, instead of being transferred to the occupants of the car, are taken up by the lever action of the springs and thrown back again. The action is very similar to that of the shock-absorber.

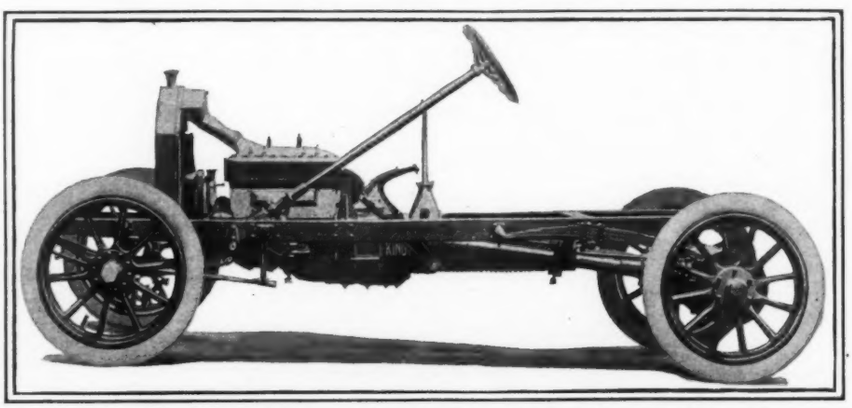
Details of the Long-Stroke Motor

In the new roadster, the long-stroke motor, which is of the four-cylinder, monoblock type, is to be found. The bore is 3 13-16 inches and the stroke is 5 1-8 inches, giving a stroke-bore ratio of 1.34. All the moving parts are inclosed. With the aim of getting the shortest possible line of travel for the gases, the valves are placed at an angle of 8 degrees. This also has a tendency to make the firing quicker, it is claimed. The intake and the exhaust open directly into the cylinders, there being no valve pockets. The crankshaft has two bearings and its diameter is 2 1-8 inches. This mounting of the crankshaft at the front and rear is a construction which is peculiar to the monoblock motor, and greatly economizes the power plant length. The timing gears are spirally cut and completely housed. A single cover plate houses all the valve-rods, tappets and springs. A peculiarly shaped fan, having two blades of aeroplane type is belt-driven. This, in connection with the thermo-syphon system of water circulation, makes up the cooling outfit of the car.

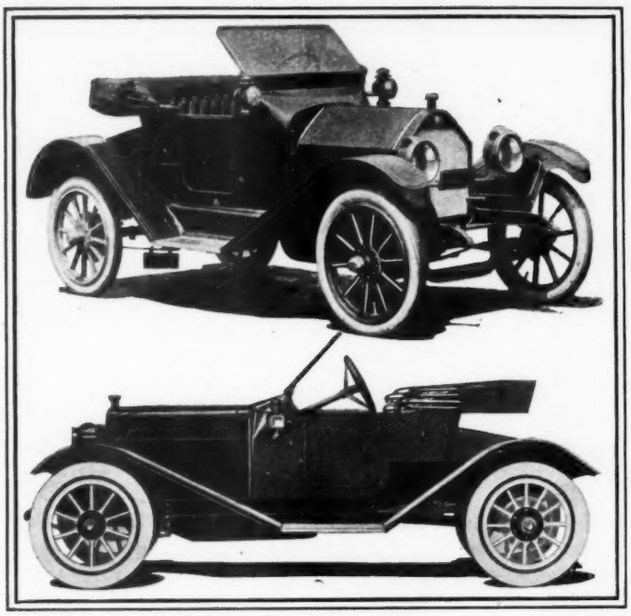
The carbureter is a Stromberg, being mounted on the valve side of the motor. The control is on the left hand side, so that the placing of the carbureter on the same side, together with the monoblock construction, makes for the minimum amount of manifold. The exhaust manifold is cast integral with the cylinders, the connection with the exhaust pipe being made at the rear of the cylinder casting.

The ignition is accomplished through the use of the Bosch magneto and dual system, using one set of spark-plugs. The magneto is mounted on a shelf at the forward end of the motor, and is driven by bevel gearing from the crankshaft, being placed at right angles to it.

Since the unit power plant idea is used, the flywheel, clutch and transmission being integrally housed with the crankshaft and motor, the lubrication of the entire mechanism is much simplified. In the King patented system oil which is put into the engine through the breather pipe serves for the motor, the



Side view of 1913 King 36 roadster, showing radiator set back of front axle



Three-quarter and side views of the 1913 King 36 roadster

clutch, the transmission and the universal joint at the front end of the propeller shaft. Each unit has its own oil compartment, and the inclosed flywheel serves the purpose of a pump in carrying the oil to an elevated trough, from whence it is delivered to the gears, bearings and so on. The grades down which the oil flows to the various friction points are made very steep, insuring positive lubrication of each bearing. The lower part of the flywheel housing is made the lowest part of the power plant, and the oil is led from the various lubricated points back into this part, which serves as a trough. In revolving, the flywheel rim runs through this trough and carries oil up into the elevated trough. Drain wells in each oil compartment catch dirt and residue and screens are provided which prevent this sediment from passing from one oil compartment into another. Both the engine base and the transmission case may be drained separately by the removal of pipe plugs.

As inspection of the chassis view will show, the control lever enters directly into the gearbox, which is made possible through the center control feature. By this construction, toggle joints and rocking shafts are done away with.

The clutch is of the multiple disk-type, consisting of thirty-two plates running in oil and contained in the flywheel. Transmission is selective, three speeds forward and reverse. The gears are flooded with oil at all times in the manner already explained.

A substantial torque tube incloses the propeller shaft which effectively maintains the relative positions of the rear axle and the transmission through the aid of two radius rods passing from the front end of the tube back to the rear axle at either side. This construction has long been a European-car characteristic and is also seen in several cars now made in this country of the monoblock-unit-power-plant type.

The torque tube bolts to the rear axle, which is of the floating type of Weston-Mott design. The weight of the car is supported on the rear axle housing, leaving the two halves of the axle shaft which pass from the differential to the rear wheels free to perform their driving function exclusively.

Novel Front Axle Mounting Scheme

The brakes are internal and external expanding, operating on the rear wheels through pedals. The right one of these pedals operates the emergency brakes and is provided with a catch for locking it in position when desired. The other pedal operates the clutch and the service brakes as well.

The front axle may be clearly seen from one of the illustrations. It is mounted at an inclination of 7 degrees, the idea in so placing it being to cause it to meet the road shocks more directly in line with the springs. The result is a caster effect. When the wheels are turned to an extreme left or right position they have an inclination towards the road. For example, if the wheels are turned to the left, they slant to the left, the claim being that tire wear is thereby reduced, and the strain on spindles, bearings and tires lessened.

The frame has a depth of 4 inches at its heaviest point in the center of the car, and it is constructed of pressed steel. It is strengthened by a cross brace at the point where the rear springs are pivoted, in addition to the motor and power plant hangings which also act as reinforcements.

The wheels are of the artillery type, of second growth hickory, and they carry 32 by 3 1-2-inch tires. The tread is the standard 56 inches.

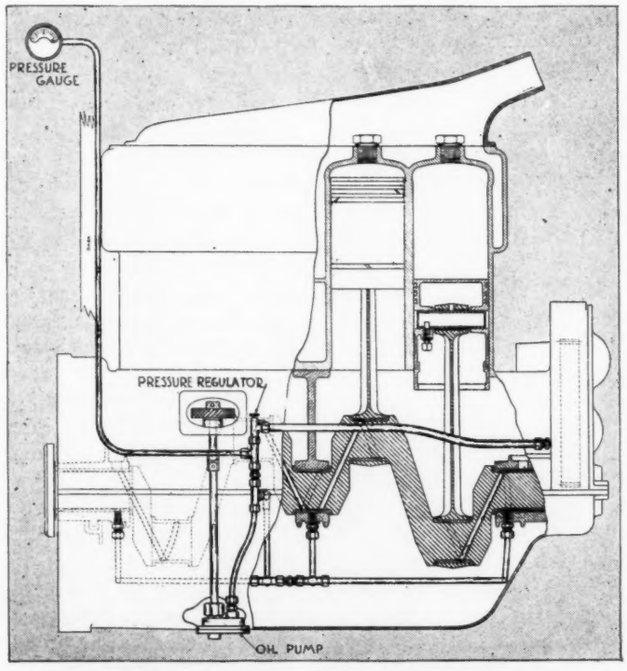
The standard equipment of the new roadster, which, by the way, is to sell for $1,190, includes a mohair top and slip cover, windshield, magneto, acetylene gas tank, gas headlights, oil side and rear lamps, horn and tools. The trimmings on lamps and accessories are black and nickel.

The body design has already been brought out. The front fender unit construction, however, is worthy of mention. The usual type front lamp brackets are done away with, the lamps being mounted directly on a steel tie tube which passes from one fender to the other, with the idea of so effectively bracing the fenders and lamps that there is no vibration of either. The lamps are raised higher than in the usual construction for the purpose of eliminating long road shadows. Gas enters the lamps through these braces, which consequently perform a double function.

—

Motor Passenger Line for La Guaira

LA GUAIRA, VENEZUELA, June 20—An extensive concession providing for an automobile passenger and freight service covering a considerable territory in this vicinity has been granted, subject to the approval of the national Congress. The concessionaire will construct the roads necessary to the maintenance of his schedule. The government will protect the enterprise from competition for a period of 30 years, but all tariffs must first be approved by the authorities before being made effective.



Lubrication scheme of the King long-stroke motor

THE AUTOMOBILE

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THE CLASS JOURNAL COMPANY

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Standardization—Dollars and Cents

DOES standardization pay?

This question affects the automobile builder, the automobile engineer, the automobile sales-manager, the automobile advertising manager, the dealer, no matter in what city he be located, the garage man, irrespective of location, the repairman, the retail salesman and, lastly, the car owner. All are interested in the work of standardizing those car parts which close study and observation decide should be standardized.

Standardization has been defined in scores of different ways and there have been as many misinterpretations of it as there have been definitions: Standardization has to do with different automobile manufacturers making certain parts of their machines or parts of uniform size, as using standard sizes of bolts or nuts in many places. The use of accepted sizes of cotter pins; accepted sizes of lock washers; accepted threads on spark-plug sockets; accepted sizes of grease cups; accepted sizes and shapes of yoke ends; accepted wheel diameters for certain tire sizes; accepted sizes of base plates for magnetos; accepted sizes of flanges for securing carbureters to intake manifolds; accepted sizes of gasoline and water connections for the gasoline line to the carbureter and the water lines to the carbureter jackets; accepted sizes of pipe diameters for car parts; accepted lengths of control arms or magneto breaker boxes and carbureter throttles; accepted sizes of sockets for electric light bulbs; accepted tolerance in bearings, and a hundred other things.

Such accepted, or recommended, practices mean money to every person connected with the industry. To grasp this, paint two parallel pictures, one of the standardized car, the other the non-standardized product, and let the owner of each become a country-wide tourist. Every tourist meets with little troubles and delays and so will the man with the standardized car and also the one with the non-standardized machine. In each case a new spark-plug is needed. Mr. Standardized Owner can secure the required plug in any garage or repair shop; the plug may not be of the same make as the one it replaces, in fact it may never have been used on his particular make of car, but that is not a factor, as the plug socket is a standard size and will take a plug that can be purchased anywhere at any time.

Parallel with this Mr. Non-standardized Owner. The engineer of his car decided that all spark-plugs were faulty and had his company build their own plugs of a standard size that met his conceptions. A new plug is needed while touring through Mississippi. The local garage men do not carry the non-standard plug, although well stocked with standard articles. The tourists has no recourse but to telegraph to the nearest branch, or dealer in his car, and patiently wait for a shipment. It may be that the dealer is just out and in turn waiting for a factory shipment and so the delay is increased. Such are the misfortunes of non-standardized parts.

As a second parallel consider the car using a non-standard filler cap on the gasoline tank. This is a small detail, but if the thread and diameter are special to that particular car and a cover gets lost it means that a substitute can only be obtained from the factory, or a branch, or dealer. On the other hand, if the car uses a standard iron pipe size, covers for such can be purchased in every town or city in the country, or practically every blacksmith shop is equipped to manufacture such an article.

A third parallel may be found in the use of yoke ends for steering parts, of which the average repairman carries a small stock. Should one call for replacement in Kansas or Oklahoma, the car owner feels that when the standardized article is used it is a speedy repair, but if a non-standard size has been used the question becomes serious.

Should his car be equipped with standard flanges on the intake manifold it is possible to install a different carbureter in Dallas without losing more than an hour or so, if in the forenoon or afternoon, and without any loss of time if the change is made at night. Should the flange be a non-standard it is impossible to install another make of carbureter without having to get a new manifold and the transition extends itself into a week's task.

Should the car have a magneto with a standard base, a change can be made in any emergency and without any loss of time, whereas it is impossible if the car is not a standardized machine.

But there is another phase of standardization rather than that of convenience—it is one of economy in repair. A standardized car is cheaper to repair throughout the country. A repairman or garageman in Denver soon discovers that his help become expert in the repair of standardized parts as they meet them on different makes of machines; whereas when non-standard parts have to be repaired a difficult and special problem is presented. The workmen are not familiar with the case. More time

is required. The repair is not so well done and the bill to the car owner is greater. Because of this it soon gets rumored around the country that certain makes of cars are expensive to repair, solely due to the lack of incorporating standard sized parts in it. Thus does the standard car become a vehicle of cheaper maintenance to its owner, a vehicle more readily repaired and a vehicle that soon gets an honest reputation for cheaper maintenance because of these factors. Thus it pays to standardize. It saves money to the owner; it adds skill to the repairman; it builds up reputations for the manufacturer; it frees the engineer of details and leaves him free to carry on research and progressive work, and it makes manufacturing quicker and cheaper to the concern building the standard parts which are sold to all of the different units constituting the industry.

Standardization is needed. It must not be too radical; it must not be the whim of the few but the mature judgment of the many; it must not precede practice but must follow it; it must not place any limitations on the inventive genius of the engineer; it must not hamper the development of the growing industry; and it must change as time demands, always shaping its course by the requirements of the period.

Metropolitan Speedway Planned

Associations to Build and Manage the Project Incorporated With a Capital of $1,500,000—International 500-Mile Race Proposed

FORMAL announcement of the plans for the construction of the Metropolitan Motor Speedway has been made at the offices of the company in New York. The Metropolitan Motor Speedway Association has been incorporated with an authorized capital of $1,500,000.

The association has been formed to take over 300 acres on the Jersey meadows near Newark for the purpose of constructing a motordrome and stadium. Ground will be broken this month and the Speedway is to be completed within a year. On July 4, 1913, the premier event will be staged—an international 500-mile race. Engineering offices have been opened in Newark, and a corps of experts engaged.

It is not merely intended to make the Speedway a stage for automobile speed contests. Long distance motorcycle races and other races will be held on the brick oval, while the infield will be available for aviation meets, baseball, football, field and track athletics, circuses, Wild West shows, etc. The entire plant will be inclosed by a high fence. The Speedway itself is to be 60 feet wide, excepting on the turns, which are to be 75 feet in width and scientifically banked with saucer curves.

Officers of the new company are as follows: H. E. Hoyt, president; A. R. Pardington, vice-president and general manager; Theodore F. Kerr, treasurer; W. H. Osborne, secretary; Fred J. Wagner, director.

Sales Managers' Meeting Put Off

Indefinite postponement has been taken as far as the convention of sales managers is concerned. The convention was originally planned for next week, but owing to the press of late business and preparation for the 1913 season it was found inadvisable to hold the convention until later.

According to announcement made by the Automobile Board of Trade the convention will probably be called for September. The regular monthly meeting of the A. B. of T. will be held July 11.

Motor Carnival Week Postponed

Automobile Carnival week, which was scheduled to be observed week after next, has been postponed until the week of September 9. Lack of interest in the project was the main reason for its postponement at this time. Another reason was the fact that July is normally vacation time on automobile row and as the 1912 business has been cleared up in good shape the row is quieter than it has been in several years. Only four agencies can deliver cars on the spot.

Denver-Chicago Reliability Run

Eleven Contesting Cars, Representing Commercial and Other Organizations of Colorado's Capital Reach the Windy City

CHICAGO, July 1—The Denver-Chicago reliability run reached Chicago to-day. The party comprised eleven cars, representing the commercial and real estate organizations of Denver, Col., the towns of Sterling, Longmont, Canon City, Steamboat Springs and Idaho Springs, in addition to four privately owned Denver machines. Governor J. F. Shafroth and Mayor Henry Arnold took part in the getaway ceremonies.

The tour started at 9 a. m. Tuesday, June 25, from the Denver Chamber of Commerce, and the participants were accompanied out of the city by a gala parade of machines. The party will remain in Chicago July 2, 3 and 4, and returning will leave here the morning of July 5, reaching Denver July 13.

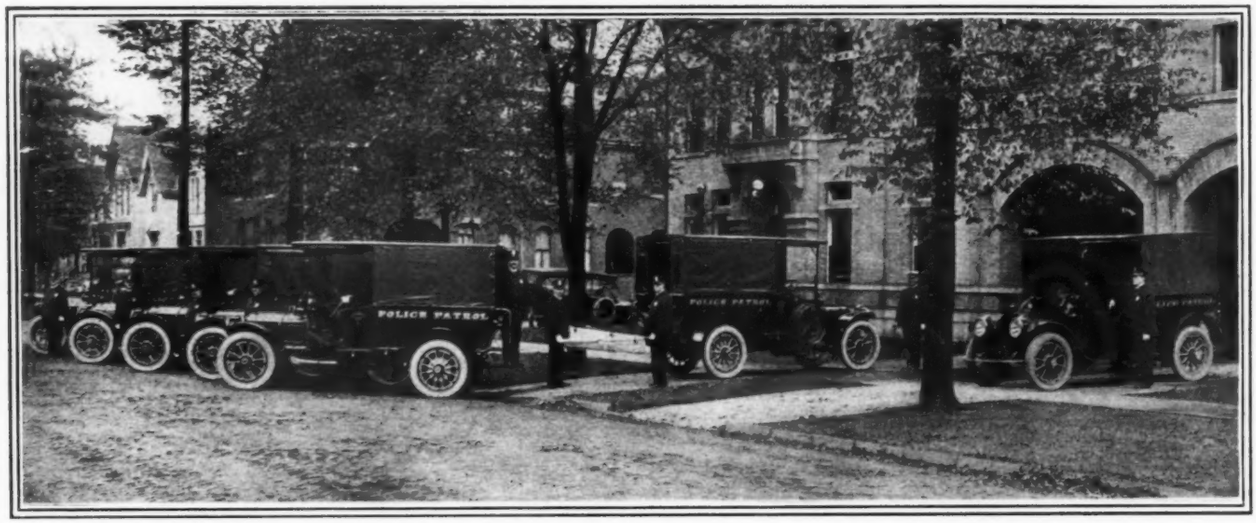
Each car was strung with banners and was well loaded with literature giving one hundred reasons why motorists should visit Colorado.

The cars entered in the run are Denver Real Estate Exchange car, R. R. Gillette; Chamber of Commerce car, Howard Smith; Denver Retail Association car, J. G. North; Sterling car, F. E. Frost; Longmont car, William McCreery; Canon City car, Mrs. Edith Myers; Steamboat Springs and Idaho Springs car, F. A. Craise; Denver privately owned and entered cars, C. L. Newcomb, John Brannan, W. H. Tompkins and Joe Lovan.

Twin Cities-Winnipeg Tour Plans

MINNEAPOLIS, MINN., July 1—With a message to the president of the state automobile association from Mayor R. D. Waugh, of Winnipeg, the Baby Mitchell Six Pathfinder has returned to the Twin Cities, with a scouting trip of 1,195 miles to its credit. The first leg of the return trip from Winnipeg ended at Grand Forks, N. D., 156 miles, passing through Emerson at the Canadian border, 68 miles from the start. The route was Hamilton, Glasston, St. Thomas, Auburn, Grafton, Harriot, Minot, Ardock, Lavant, Manville. At Grand Forks the arrival will be coincident with the opening of the North Dakota state fair. The next day's run was 163.8 miles to Breckenridge, Minn., through Crookston, Beltrami, Ada, Moorhead and Fargo, Comstock, Iverson, McCauleyville and Kent. A 20-minute control was established at Ada. The next leg was to Fergus Falls, Elbow Lake and Alexandria, Glenwood, Annandale, Rockford and Robbinsdale to Minneapolis. All sorts of scenic effects are to be found on the run, especially in the White Earth Indian reservation in Minnesota and in Canada. Returning the route is through lake park district, one of the most beautiful in the Northwest. Within the city limits of Minneapolis are 18 beautiful lakes such as cannot be found anywhere in similar location in the world.

BULLETIN News of the Week Condensed



A portion of Detroit's Packard motor patrol squadron. Officers in center represent first aid to injured

DETROIT Motorizes Police Department—With the addition of two Packard police patrols to the seven already in use, the motorization of the Detroit, Mich., police department is complete. Commissioner Croul declares that one automobile patrol with two men can cover as much ground as three horse-drawn wagons and give much better service. The cars in the department responded to 32,939 calls last year and covered 81,599 miles.

Berndt Assistant Manager for Remy—Arthur H. Berndt will become assistant manager of the Indianapolis branch of the Remy Electric Company September 1.

New Denver Accessory House—The Shaffer Auto Supply Company, 1240 Broadway, Denver, Col., is a new organization which will handle standard accessory and supply accounts.

Remy Appoints Lolly—The Remy Electric Company, Anderson, Ind., maker of the Remy magneto, has appointed W. H. Lolly of London, Eng., an engineer in the service department.

Loomis Resigns from Speedwell—Gilbert J. Loomis, who has been general sales manager of the Speedwell Motor Car Company for the past 5 years, has resigned, to take effect August 1.

Oustendorf Buys Out Partner—George Oustendorf, Franklin dealer in Buffalo, N. Y., has just bought out the interest of H. E. Crosby, formerly associated with him in the Franklin dealership.

Tisdale Buys Control—Glenn A. Tisdale, of the Franklin Motor Car Company, dealer for the Franklin car in the New York City territory, has bought the controlling interest in the firm of the John Kerkin Company.

Packers Branch in New York—The Packers Motor Truck Company, Wheeling, W. Va., has opened a branch office at 1734 Broadway, in the U. S. Rubber building, corner of Fifty-sixth street. Besides the office at that location, the Packers have a service station of 7,500 square feet, on West Forty-second street, with complete equipment and expert mechanics.

Dawson to Go on Stage—Joe Dawson, winner of the second annual 500-mile International Sweepstakes race at the Indianapolis Motor Speedway last Memorial Day, is to embark in the theatrical business. Dawson announces that he is being booked to appear in many of the larger cities during the next few months and will probably be engaged throughout the winter on the vaudeville stage.

To Control Taxicab Drivers—An amendment has been passed by the legislature of the Province of Quebec which will give the cities the right to make by-laws controlling chauffeurs of automobiles and taxicabs kept for hire as cabmen are now controlled, and to inspect the meters in taxicabs. It will also make it possible to establish a fine for passengers in these vehicles who do not pay the regular fare, the standard for which will be set.

Buy Out Broad-Oak Company—R. M. Weaver and W. J. Miller have purchased the entire capital stock of the Broad-Oak Automobile Company, which operates a sales agency and garage at 622 Oak street, Columbus, O. The purchasers take charge of the business July 1. Both men have had considerable experience in the automobile business and they announce improvements and extensions will be made. The concern has the central Ohio agency for the Chalmers and Pierce-Arrow.

R-C-H Branch for Frisco—To handle its constantly increasing business in the Pacific Coast territory, the R-C-H Corporation has completed arrangements for opening a branch and service station at San Francisco on July 1. The building secured for this purpose is a three-story structure on Ellis avenue, just off Van Ness, in the heart of the new automobile district of San Francisco. A floor space of 18,000 square feet is available for display and parts storage. The San Francisco branch will be used as a car and replacement distributing point for the entire West, and a sufficient supply of cars will be kept on hand to take care of rush orders at all times.

City's Street Cleaning Automobile—Mr. Edwards, street cleaning commissioner of New York City, intends to use motor trucks in the disposal of garbage.

Truck Saves $4,200 Annually—A milling company of New Orleans, La., has estimated that it saves $4,200 annually by the use of a 5-ton General Motors truck.

Wagner Sales Manager—Howard E. Wagner of New York City has accepted the position of sales manager with the Buffalo Electric Vehicle Company, Buffalo, N. Y.

Durable Dayton Service Station—The new service station and salesrooms at 1700 Wabash avenue have been opened for Chicago, Ill., users of Durable Dayton motor trucks.

Builds in Columbus—A permit for garage building has been taken out by Viola Horn, Columbus, O., who will erect a public establishment between High and Third streets.

Currier Now in Charge—M. B. Currier, Columbus, O., who has been a mechanical expert with the Interstate Auto Company, has been placed in charge of the Columbus agency.

Wilson Called East—Orin S. Wilson, for 2 years general manager of the Studebaker Colorado Vehicle Company in Denver, Col., has been called East to supervise more extensive territory. He has been succeeded by his assistant, J. C. Beck.

Lozier's New Boston Building—Work has been started on the foundation of the new Lozier building on Commonwealth avenue, Boston, Mass., and it is expected that the new structure will be completed and ready for occupancy about September 1.

Lansden Electric in Boston—The Lansden Electric Vehicle Company has been formed in Boston, Mass., with Albert B. Freeman, president; Gardner Freeman, treasurer, and William H. Britton, secretary. The company recently took the agency for the Lansden electric truck for Boston.

Automobile Affects Horse-Breeding—The great popularity of the automobile, according to army officers, is having the effect of causing a marked diminution in the breeding of middle and inferior grades of horses, thus rendering it difficult to secure animals for the cavalry and artillery service.

Locomobile Branch in New Quarters—The Los Angeles branch of the Locomobile Company, which was temporarily located at 942 South Grand avenue, is now occupying new permanent headquarters at Pico and Grand avenues. The new building was secured, as it is larger and offers more facilities for giving customers prompt and efficient service.

New Home for Motor Company—Negotiations are under way for a new home for the Longstreth Motor Car Company, Philadelphia, which handles the Alco. The plans provide for a modern concrete building approximately 66 by 125 feet at 2126-28-30 Market street. It is expected to have the building ready for occupancy about September 1.

Will Enrich Automobile Gasoline—The Acetol Company has been formed by P. C. Avery, of Milwaukee, Wis., and other interests to market an invention by Mr. Avery of a chemical compound to enrich gasoline. Mr. Avery is chief owner of the Avery Portable Lighting Company, which formerly produced the Auto-Gas tank and later the Electrobola motor lamps.

Denver Club Suggests Improvements—Mayor-elect Henry Arnold of Denver has asked the co-operation of the Denver Motor Club in the way of suggestions for the improvement of existing traffic ordinances and in the stationing of the traffic police squad. The club responded with suggestions for fifty-six ordinances, some of which are certain of adoption.

Keeton Company Secures Good Man—The Keeton Motor Company, Detroit, Mich., builder of the Keeton French type, has announced another addition to its office force in the person of H. D. W. MacKaye. He is now to be connected permanently with the Keeton Motor Company as assistant to the president, and will also take charge of the purchasing.

Government Department Buys Trucks—The Bureau of Engraving and Printing, like many other Federal departments, is gradually doing away with the horse-drawn vehicle in favor of the automobile. The purchasing agent of the department has just received bids for one 8,000-pound truck, one 5,000-pound truck, one coupé and one delivery wagon. The number of bids submitted was so great that announcement of the awards will not be made for several days.

Young Severs Lozier Connection—C. S. Young, engineer and designer with the Lozier Company, has severed his relations with that organization to become assistant general manager with the Regal Motor Car Company, Detroit, Mich.

Everett in Louisville—The Everett Motor Car Company, Detroit, Mich., has established a branch office in the Coleman building, Louisville, Ky. E. L. Jacoby, formerly manager of the Studebaker branch at Memphis, Tenn., is in charge.

District Managers Meet—Enthusiasm, good fellowship, business and pleasure were the predominating features which marked the 3 days' convention of the district managers, allied with the Willys-Overland Company, held at Toledo, O., recently. Each state in the Union was represented, as well as Canada. Among the pleasure features were the smoker at the Overland Club on Maumee Bay, banquet at the Toledo Yacht Club, launch rides on Lake Erie and a theatre party. The company intends to build 40,000 cars this year.

Outing of Overland district managers at Overland Club House, Maumee Bay, during annual convention

Kelly Branch in Indianapolis—The Kelly Truck Company has opened a factory sales branch and service station at 9 East Pratt street, Indianapolis, Ind. The company has a number of its trucks in operation in the city.

Richmond to Have Truck—Charles F. Taylor, of the Richmond, Va., tire commission, announces that the board is now considering the motorizing of the entire fire department. President Taylor says that if the fire department is motorized, the city will save at least 50 per cent. in operating expenses, making a total saving of $60,000 to $90,000 annually.

To Start Truck Line—An automobile truck service between Hamilton, Ont., and Toronto for the transportation of perishable and household goods between the two cities is being planned by the Grant Cartage and Forwarding Company which will place in operation ten machines as soon as the service is opened.

City Cars Need Not Register—Cars owned by the city of New Orleans, La., if plainly lettered, showing the department to which they belong, will not be required to carry license tags. This decision was rendered recently when an effort had been made to force the registration of the city's machines.

Shreveport Collects Car Tax—Taxes are being collected by the city of Shreveport, La., on approximately $1,000,000 worth of motor cars. The taxation, however, is not based on the valuation, but is graded as follows: 2 passenger cars, $2; 4 passenger cars, $3; 5 passenger cars, $4; 7 passenger cars, $5. Trucks pay $1 and public transfer wagon $10. The tax is assessed annually.

More Cars in Michigan—Secretary of State Martindale believes that the sale of automobile licenses this year will bring the State of Michigan $150,000. More than $119,000 already has been received. During 1911 the fees amounted to $102,913.

Scranton Repair Shop Burns Down—The repair shop of Robert Lance, Scranton, Pa., was burned recently.

Shay Leaves Ozburn Company—W. J. Shay has sold his interest in the Ozburn Automobile Supply Company, Memphis, Tenn., to N. F. Ozburn. Mr. Shay now will devote his time to the organization of the United States Sales Corporation, which will deal in accessories.

Big Convention of Haynes Men—About 300 salesmen and agents of the Haynes Automobile Company were entertained recently at the factory in Kokomo, Ind. The city was decorated for the occasion, every business house displaying Haynes pennants, while in many windows were shown parts of the Haynes car. The guests were forbidden to spend their own money, each man being given fifty certificates which were accepted as money by Kokomo merchants.

New Automobile Agencies

PLEASURE CARS

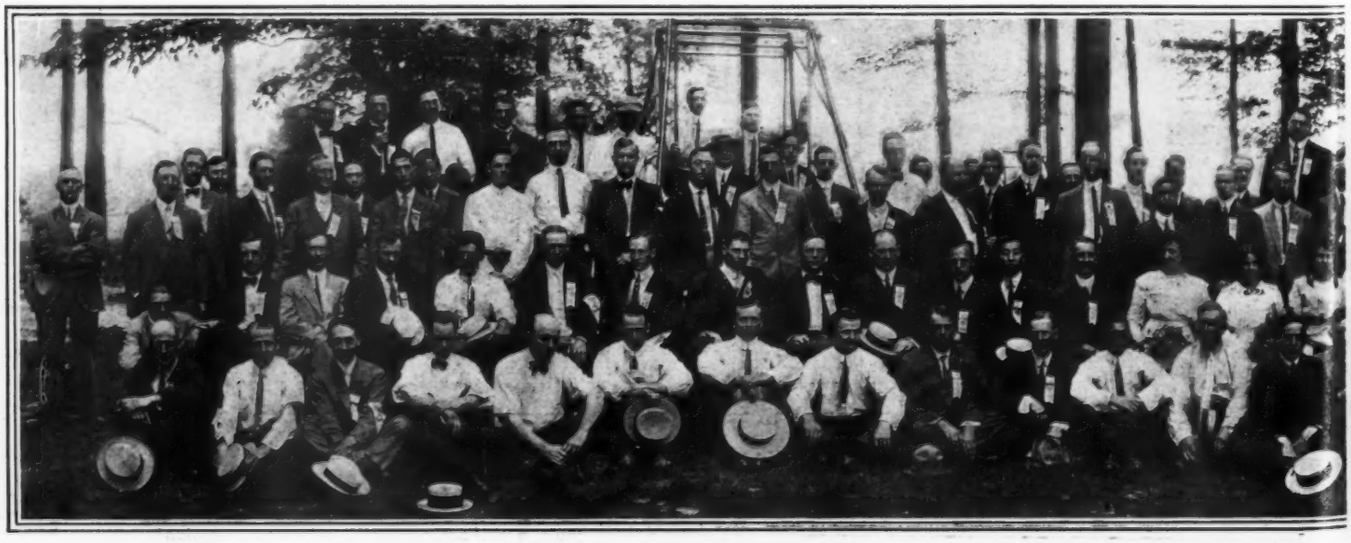
Place	Car	Agent
Alexis, Ill.	Henderson	W. K. McKnight.
Anderson, S. C.	R-C-H	Fowler's Garage.
Atlanta, Ga.	Henderson	Dan Walraven.
Belvidere, Ill.	R-C-H	H. H. Collier.
Boston, Mass.	Havers Six	Fred O. Hoyt.
Boston, Mass.	Henderson	James A. Binney.
Champaign, Ill.	R-C-H	A. L. Percival.
Cleveland, O.	Little	Co-Operative Garage.
Croswell, Mich.	R-C-H	Fred A. Moore.
Des Moines, Ia.	Paige-Detroit	Interstate Auto Co.
E. Liverpool, O.	R-C-H	G. W. McNichol.
Erie, Pa.	R-C-H	Murphy Brothers.
Fergus Falls, Minn.	R-C-H	Martin Johnson Auto Co.
Iowa City, Ia.	Franklin	F. C. Carson.
Kansas City, Mo.	Franklin	W. F. Kneip and E. F. Williams.
Laurens, S. C.	R-C-H	Rounds Auto Co.
Mankato, Minn.	R-C-H	Mankato Automobile Co.
Mansfield, O.	R-C-H	Myers & Morris.
Matoon, Ill.	Henderson	Mattoon Refrigerating Co.
Middletown, O.	E-M-F, Flanders, Oakland, R-C-H and Oldsmobile	F. Van Sickle and W. F. Nichols.
Milwaukee, Wis.	Carterear	D. Wittenberg.
Milwaukee, Wis.	R-C-H	Smith-Hoppe Auto Co.
Morris, Ill.	R-C-H	O. T. Wilson.
Niles, O.	R-C-H	Park Auto Sales Co.
Oak Grove, Mo.	R-C-H	W. T. McLaurins.
Omaha, Neb.	Firestone-Columbus	W. H. Hellen Motor Car Co.
Painesville, O.	R-C-H	Star Garage.
Philadelphia, Pa.	Henderson	Johnson Motor Car Co.
Plainfield, N. J.	Henderson	Service Garage.
Princeton, Ill.	R-C-H	Evans & Coopins.
Roanoke, Ala.	R-C-H	R. L. Allen.
Rochester, N. Y.	Henderson	Fred E. Wilson.

Increase of Franklin Business—According to the Franklin Automobile Company, distributing agent for the Franklin, the average increase of business done so far this year by 41 per cent. of the Franklin dealers in various states is 122 per cent. over that done during the first half of last year.

Albany Forbids Use of Cut-Out—The common council of Albany, N. Y., has adopted an ordinance prohibiting the use of a cut-out for a motor vehicle.

Saxon Company Moves—The Saxon Manufacturing Company, Toledo, O., maker of automobile lamps, horns and accessories has removed from its original building on South Ontario street to larger quarters on Cherry street. The new building has been remodeled, refinished and refurnished.

Nichols Goes to Detroit—Fred C. Nichols, for the past 2 years connected with the Whitten-Gilmore Company in Boston, agent for the Chalmers, has resigned to accept a position as assistant to Percy Owen, sales manager of the Chal-



Annual house party of the Haynes Automobile Company, at Kokomo, Ind. Included in the picture are

Pleasure and Commercial

PLEASURE CARS

Place	Car	Agent
St. Michael, Minn.	R-C-H	H. W. Dick & Son.
Salt Lake City, Utah.	Columbia, Maxwell.	Salt Lake Automobile Exchange.
San Francisco, Cal.	Marathon	Samuel Hables.
Seattle, Wash.	Franklin	W. A. Wicks.
Toledo, O.	Little	American Motor Sales Co.
Washington, D. C.	Henderson	Matheson Motor Car Co.
Wheeling, W. Va.	R-C-H	R-C-H Motor Co.
Winston, Mo.	R-C-H	W. H. Dice.

ELECTRICS

Philadelphia, Pa.	Babcock	John Wanamaker.
Washington, D. C.	Hupp-Yeats	Storm Motor Car Co.
Washington, D. C.	Standard	W. P. Barnhart Co.

COMMERCIAL VEHICLES

Allentown, Pa.	R-C-H	Queen City Motor Co.
Battle Creek, Mich.	R-C-H	F. E. Riley.
Boston, Mass.	Veerac	W. L. Russell & Co.
Coldwater, Mich.	R-C-H	Coffman & Boucher.
Harrisburg, Pa.	B. O. E.	J. M. Mack.
Kansas City, Mo.	Regal	E. P. Moriarty & Co.
Louisville, Ky.	Baurer, Mack and Hewitt	Leyman Motor Co.
Middletown, O.	Chase	F. Van Sickle and W. F. Nichols.
Milwaukee, Wis.	G. M. C.	Skuol & Schauer.
Montreal, Que.	Foden (steam)	Jones & Glascco.
Philadelphia, Pa.	Chase	Chase Motor Sales Co.
San Francisco, Cal.	Lippard-Stewart	A. E. Hunter Motor Car Co.
Scranton, Pa.	R-C-H	Edward and Harold Conrad.
Woodstown, N. J.	R-C-H	Newton & Reeves.
Washington, D. C.	Kelly	Peerless Motor Transfer Co.

mers at the factory in Detroit. R. A. Dobyns, secretary of the Bay State A. A. for the past 2 years has taken Mr. Nichols' place with the Whitten-Gilmore Company.

Phelps Gets Promotion—George H. Phelps, who, during his year's service as manager of the retail branch of the Boston salesrooms of the Studebaker Corporation, placed it in second place in the number of sales, has been promoted to be manager of the New York branch of the company to succeed Charles F. Redden. Frank X. Coveney has been made manager of the Boston retail branch succeeding Mr. Phelps, while Phil Hawley is manager of the wholesale department in charge of the New England district.

Richards With Michigan—F. W. Richards, who was formerly connected with the Boston, Mass., branch of the Premier car, is now sales manager of the Boston agency recently opened for the Michigan.

Day Baker Lectures in Canada—President Day Baker of the Electric Vehicle Club of Boston, Mass., and agent for the General Vehicle Company, had the honor of being the first person chosen to deliver an address before the newly formed Montreal Electrical Society. His topic was the Electric Vehicle, Its Source and Its Future. He illustrated it with many lantern slides, among them ones showing the recent parade of electric vehicles in Boston.

Mercer Kansas City Branch—The Mercer Company, Trenton, N. J., has opened a branch in Kansas City, Mo., in charge of Roy O. Kendall.

Reorganizing Austin Company—With George H. Davidson and W. R. Shelby interested with James E. and Walter S. Austin, the Austin Automobile Company, Grand Rapids, Mich., is being reorganized with a capitalization of $500,000. Of this, $300,000 will be common stock and $200,000, six per cent. preferred. Stock will be open for popular subscription and a 50 per cent. bonus of common may go with the preferred. An advertising campaign will be inaugurated and it is planned to build a new factory.

Habersham Succeeds Villet—E. H. Habersham has been appointed manager of the wholesale branch of the Studebaker corporation in Washington, D. C., succeeding E. M. Villet, who has been transferred to the Fargo, N. D., branch.

Lowell Traffic Regulations—Street traffic rules have been adopted by the Lowell, Mass., city officials similar to the regulations in use in Boston and other cities designed to improve conditions. The new regulations provide that owners of vehicles must not allow them to stand for any great length of time unattended, and on some of the busier thoroughfares the vehicles must not stand only long enough for persons to enter or alight. All vehicles must at all times stand parallel to, and near the right hand curb. Vehicles are not allowed to stand within 75 feet of the corner of some of the intersecting streets on the main thoroughfares.

Halliday Traveling for Thomas—Norman N. Halliday, manager of the Boston branch of the E. R. Thomas Motor Car Company, has been despatched on a tour through the West by the factory to call on dealers and branch managers and also to establish agencies for the Thomas where needed.

Wants Better Regulations—Through its board of governors, the Bridgeport, Conn., Automobile Club is endeavoring to provide important changes in traffic regulations. Many complaints have been made that little attention is paid to the rules of the road in the city. The club officials want to have the rule of keeping to the right enforced, some of the busy streets made one way thoroughfares, and to prohibit vehicles standing on the streets for long periods where there is much traffic.

Haynes agents, branch managers, and representatives, parts factory experts and magazine and newspaper men

New Home of the George C. Brinkman Motor Company, which represents the Nyberg and National in St. Louis

News of the Garages

KOLB Builds in Erie—William Kolb has built a large garage on Spring street, Erie, Pa.

New Garage for Adams.—W. C. Garrison, Adams, Neb., has bought a lot, where he will erect a cement block building to be used as a garage.

To Give Out Contracts—The Ellis Motor Car Company, New York City, will soon give out contracts for the work of building a $12,000 garage.

Romare Enters Garage Business—O. E. Romare, formerly designer and maker of astronomical instruments, has decided to build a garage at Lake Geneva, Wis.

Municipal Garage in Columbus—Ordinances have been adopted by the city of Columbus, O., for an appropriation of $2,800 for the erection of a garage to house the motor patrol wagons of the police department.

Columbus to Have City Garage—The city government of Columbus, O., has voted for the erecton of a city garage which is to house the vehicles used by city officials. The city is now taking bids for the work.

Sturgeon Bay Garage Expands—The J. C. Dana Company, Sturgeon Bay, Wis., is building a 32 by 100 foot addition to its garage. A part of the addition will be equipped as a large repair shop. Elevators will be installed in the structure.

Toronto Will Get Another—A new garage will be added to Toronto's directory as soon as Death & Watson, Ltd., electrical engineers, complete the erection of their plans regarding an establishment for housing gasoline and electric cars.

Fireproof Garage Opened—A concrete garage has been opened in Rockford, Ill., by Lee Stewart. The garage is two stories high, but requires no elevator, as the lower floor is at the street level and the upper floor slightly above that of the alley.

Hayes Lays Out Plans—Edward Hayes, of Los Angeles, Cal., has laid out his plans for a one-story brick garage and repair shop. The building will be erected on a lot 55 by 75 feet, and will have a pressed-brick front, cement floors and composition roof.

Dorley Builds Addition—A large addition has been built to the garage owned by J. N. Dorley, Gloucester, Mass., giving a floor space of about twice the size of the old structure. A new office addition has been added to the front and a repair shop in the rear also.

Owatona to Have Garage—R. W. Sander and Paul J. Sander have leased a garage which is being erected at Owatona, Minn., and will have it equipped by July 20. The building is 50 by 114 feet and will accommodate fifty cars. P. J. Sander will have charge of the repair department.

Toledo Garage Issues Guide—The United Garage, Toledo, O., has issued an interesting guide showing several newly completed roads of northern Ohio and giving the best routes out of Toledo to distant points. A number of shorter routes and week-end journeys for pleasure jaunts are also given.

Janesville Establishment Enlarged—J. A. Strimple, Janesville, Wis., agent for Mitchell products, has purchased the garage and agency business of S. B. Echlin, 219 Milwaukee street, and will move there at once. He thereby becomes Reo and Chalmers agent, and plans to enlarge the building as well as his stock.

Bentley to Have New Building—B. Court Bentley, proprietor of the garage on Main street, Westerly, R. I., is to erect a new building on the site of the old structure which was partly destroyed by fire some time ago. The new building will be 30 by 100 feet with an addition in the rear 20 by 40 which will be used as a machine shop.

St. Paul Garage Changes Hands—Merrit J. Osborn, St. Paul distributor for White cars, has taken over the Western Automobile Company Garage and will operate it together with the establishment now conducted at 15 East Ninth street. At the second place the main office will be located and there trucks will be stored. A driver's school will also be conducted.

Ground Broken in Northampton—Ground has been broken on Maple street, Northampton, Mass., for a garage capable of housing thirty-five cars on the lower floor, and the walls will be built strong enough to carry an additional story whenever the business warrants the building being enlarged. It will have modern equipment and will be conducted by Frank S. Parsons.

Automobile Incorporations

AUTOMOBILES AND PARTS

AKRON, O.—Akron Gear & Engineering Company; capital, $20,000; to manufacture gears for the transmission of power and to do general machine work. Incorporators: J. R. Triplett, Otis E. Prier, T. A. Seacrist, E. T. Dwyer, John E. Blower.

BARBERTON, O.—Todd & Courtney Company; capital, $10,000; to deal in automobiles, wagons and other vehicles. Incorporators: John H. Todd, O. I. Courtney, Laura E. Courtney, C. C. Courtney.

BROOKLYN, N. Y.—Saratoga Auto Company; capital, $5,000; to engage in the automobile business. Incorporators: George D. Smith, Harry A. Bogart, Emily J. Bogart.

BUFFALO, N. Y.—Automobile Vehicle Corporation; capital, $20,000; to manufacture automobiles and other vehicles. Incorporators: A. L. Kenyon, Frank O'Neill, Otto A. Hegelm, James C. Fox.

CLEVELAND, O.—Automobile Owners Company; capital, $25,000; to deal in automobiles and accessories and to operate a vulcanizing plant. Incorporators: P. L. A. Leighley, H. N. Pettibone, W. K. Stanley, Frank H. Forrest, John E. Griesheimer.

COLUMBUS, O.—Everitt Auto Sales Company; capital, $30,000; to carry on the sale of automobiles. Incorporators: Horace K. Dobson, Amos F. White, Elmer F. McConaha, H. H. Kallenberger, A. W. Daving.

FLATONIA, TEX.—Flatonia Automobile Company; capital, $5,000; to engage in the automobile business. Incorporators: C. P. Johnson, D. McKay, F. F. Wotpka, H. Nolle, J. W. Snell.

LIMA, O.—Gramm-Bernstein Company; capital, $500,000; to manufacture and deal in pleasure and freight automobiles and other vehicles. Incorporators: B. A. Gramm, Max Bernstein, Fred Biesantz, Dudley Bernstein, H. O. Bentley.

NEW YORK CITY—American Society of Automobile Owners; capital, $10,000; to protect the interests of automobile owners. Incorporators: Robert J. Kennedy, Joseph C. Murray, Alexander Woods.

PORTLAND, ME.—Edwards Motor Car Company; capital, $1,250,000; to engage in the automobile business. Incorporator: Clarence E. Eaton.

SOUTH BEND, IND.—Otis Motor Car Company; capital, $10,000; to manufacture automobiles. Incorporators: N. L. Otis, J. B. Beattie, Gilbert Squires.

WILMINGTON, DEL.—Rutenber Motor Company; capital, $1,350,000, to manufacture and deal in gas, gasoline explosive, steam and all other kinds of motors and power generators.

GARAGES AND ACCESSORIES

BABYLON, N. Y.—Babylon Garage Company; capital, $500; to conduct a garage. Incorporators: Charles H. Duryea, William E. Sprague, Annie M. Sprague.

BROOKLYN, N. Y.—Saratoga Garage, Inc.; capital, $1,000; to engage in the garage business. Incorporators: John S. Klinger, Martin Stoehr, George D. Rockenbach.

CHICAGO, ILL.—Washington Motor Livery Company; capital, $75,000; to conduct a garage and repair business. Incorporators: C. Leviton, J. Lowenhaupt, S. E. Loeb.

Motor Fire Apparatus

ALBANY Installs Motor Apparatus—Albany was added to the list of cities having motor fire apparatus recently by the installation of a motor-driven fire engine.

Milwaukee Department to Be Modernized—Milwaukee, Wis., is in the market for three combination chemical and hose trucks which should not cost more than $6,000 each.

Cambridge in the Market—A committee of the Cambridge, Mass., board of aldermen has been appointed to consider the advisability of buying some motor fire apparatus for the city.

Motor Equipped Fire Apparatus—The Springfield, O., councilmen have decided to equip the present apparatus with motors instead of buying new ones. They will cost from $5,000 to $6,000 each.

Milwaukee's Cartercar Roadsters—The Chicago branch of the Cartercar Company recently received an order from the city of Milwaukee, Wis., for seven roadsters. The cars will be used in the fire department.

Arlington Wants More—The town fathers of Arlington, Mass., are so well pleased with the motor apparatus attached to the fire department that they are after more, and now they want a combination hose and engine that will pump a good stream.

La Crosse Safest City—The Wisconsin Fire Prevention Bureau, after inspection, has declared that LaCrosse has the least gasoline hazards in the state, in that both public and private garages have ideal facilities for storing and handling gasoline and oil.

Philadelphia Fire Department Motorizing—The city of Philadelphia will soon be in the possession of motor fire apparatus costing $35,000. This sum has been granted out of the recently floated city loan of $4,225,000. Seven automobiles are to be bought and bids will be taken on and after July 8.

A portion of the White contingent which took part in the motor vehicle trials of the Russian War Department

Washington Automobile Pump Satisfactory—Chief Wagner of Washington, D. C., has expressed his satisfaction with a new automobile fire engine which was tested here a few days ago. The engine and pump lifted more than 800 gallons a minute which is 100 gallons in excess of the required quantity.

Gotham's New Fire Apparatus—The International Motor Company has been awarded the New York City contract for five 2-ton chassis, mounted with combination hose and pumping bodies which are to be used for suburban service. These two pieces will make ten pieces of fire apparatus delivered by the company to the city of New York.

Watertown Orders Motor Fire-Wagon—The Selectmen of Watertown, Mass., have placed an order with the Locomobile Company, Bridgeport, Pa., for a new motor combination chemical that will cost $5,800 and which is to be delivered August 1. It will be housed in the new fire station recently built on Mt. Auburn street in anticipation of such a purchase.

Eight Columbus Fire Automobiles—The Seagrave Company, Columbus, O., has been given an order by the city of Columbus, for six automobile tractors, four combination horse and chemical wagons and one supply truck, to be delivered and paid for by $49,850. The Columbus Buggy Company has been awarded a contract for a squad wagon which is to cost $2,050.

White Leads in Russian Army Test—The White Company, Cleveland, O., has received news that the White team in the Russian War Office motor vehicle trials still had a perfect score after covering 1540 miles of the difficult test route. At the time the report was sent only 420 miles remained to be covered. The White cars also surpassed the European cars in the trial in economy of gasoline and oil.

Motor Fire Apparatus for Taunton—A Pope-Hartford combination motor chemical and hose truck that was built from designs submitted by Chief Leonard of the Taunton, Mass., fire department, has been delivered. This is the first step toward motorizing the Taunton fire department. The new vehicle combines some new features not embodied in regular motor trucks. The hose body is built in two box-shaped compartments which have a capacity for 500 feet of hydrant hose each, while these boxes are so arranged that they afford seats for the firemen, and the ladders being carried on the sides make a back rest for the men. This vehicle will take the place of two hose wagons and one chemical which means the passing of six horses. So well pleased are the builders of the truck that they have decided to build others along these same lines.

Automobile Incorporations

COLUMBUS, O.—Federal Auto Accessories Company; capital, $2,000; to deal in all kinds of automobile accessories and supplies. Incorporators: J. R. Loofburrow, H. M. McDonald, W. C. Wetherhold, N. J. Mace, M. L. Mace.

LOUISVILLE, KY.—Punctureless Tire Company; capital, $5,000; to manufacture a punctureless tire. Incorporators: Andrew T. Murphy, John H. O'Neill, John S. Hobson.

MUNCIE, IND.—Feeney-Hurd Company; capital, $20,000; to manufacture automobile accessories and supplies. Incorporators: Edmund J. Feeney, James H. Leffler, Carl E. Hurd, J. D. Miltenberger.

LOS ANGELES, CAL.—Essenkay Sales Company; to sell a resilient filler for automobile tires. Incorporator: L. N. Brunswig.

LYNN, MASS.—Seymour Avenue Garage; capital, $25,000; to engage in the garage business. Incorporators: Charles R. Sibley, John E. Moulton, Ellery Jefts.

NEW YORK CITY.—American Motor Freight Company; capital, $25,000; to conduct a freight transfer business. Incorporators: Harry G. Waring, Harvey W. Bell, Howard G. Philipps.

NEW YORK CITY—Amherst Auto Renting Company; capital, -5,000; to rent automobiles. Incorporators: Peter V. Hoyt, Daniel J. McAndrews, George Schippereit.

NEW YORK CITY—Universal Auto Supply Company; capital, $10,000; to manufacture automobile supplies and accessories. Incorporators: John J. Tracy, George F. Connelly, John R. Hunt.

NEW YORK CITY—Goldfinger Auto Renting Company; capital, $2,000; to conduct an automobile-renting business. Incorporators: Benedict Goldfinger, Walter E. Fisher, Isaac Wolf.

NEW YORK CITY—Long Acre Garage. Incorporated; capital, $1,500; to conduct a garage business. Incorporators: Lewis M. Borden, George Gulbransen, Joseph F. Taylor.

SCITUATE, MASS.—Egyt Garage & Machine Company; capital, $6,500; to conduct a garage and repair business. Incorporators: William E. Chaffin, Charles M. Litchfield, Charles W. Pears.

SYRACUSE, N. Y.—Mohawk Tire Company; capital, $6,000; to engage in the manufacture of automobile tires. Incorporators: Henry J. Moses, Winifred G. Rice, Clarence E. Rice.

TOLEDO, O.—Peerless Rubber & Tire Company; capital, $10,000; to manufacture tires and other accessories. Incorporators: R. G. Wierman, Jno. T. Hickman, Edward Umbstraedter, J. R. Humphrey, William B. Woods.

TOLEDO, O.—Walker Tire Chain Company; capital, $15,000; to manufacture tire chains and deal in accessories of all kinds. Incorporators: Henry R. Rohrman, Charles A. Newman, Charles P. Eger, A. M. Edwards, George C. Bryce.

CHANGES OF CAPITAL

DETROIT, MICH.—Keeton Motor Company; capital increased from $10,000 to $300,000.

LEXINGTON, KY.—Bayless Motor Car Company, name changed to Central Motor Car Company.

TOLEDO, O.—Rassel Motor Car Company; capital decreased from $125,000 to $95,000.

Factory Miscellany

BIG Pennsylvania Tire Plant—The new factory of the Pennsylvania Rubber Company, Jeanette, Pa., consists of shops, stockrooms, storerooms and other departments aggregating a floor-space of 117,000 square feet. The main building is 300 by 50 feet and three stories high, in addition to which it has a basement 150 by 48 feet. The mechanical goods department is a single-story building, 216 by 230 feet, with a basement 116 by 90 feet, and an annex, 43 by 24 feet. Among the products of the factory are Vacuum Cup tires and other soft and hard rubber goods.

Florida Factory Crystallizing—C. W. Birchwood, Chicago, Ill., plans to establish an automobile factory at Jacksonville, Fla.

Buffalo Pump Maker Builds—The Manzel Brothers Company, Buffalo, N. Y., is building addition to its factory. The company makes automobile pumps.

New Tire Factory Building—Indianapolis, Ind., will soon have another large factory building, this being the new $100,000 plant which will be built by the G. & J. Tire Company.

Dayton Body Factory Building—The Dayton Body Company, Dayton, O., has acquired a site upon which it will erect a new factory building in which to carry on its manufacturing operations.

Carbureter Company to Expand—The Star Carbureter Company, 685 East Atwater street, Detroit, Mich., is considering the erection of a factory annex to increase its output of carbureters and other automobile parts.

Bizzants Is Chief Engineer—Fred Bizzants has taken the position of chief engineer and factory manager for the Gramm & Bernstein Company, Lima, O., which will soon open a factory for the manufacture of motor trucks. The plant of the American Strawboard Company is being remodeled into a factory for the making of motor trucks.

Locomobile's Truck Plant—The Locomobile Company, Bridgeport, Conn., has commenced work on the new building which is to be used for the construction of its commercial vehicles. The new building should be completed within the next 60 days and until that time trucks will be constructed in the regular departments of the factory.

Students Visit Goodyear Plant—Accompanied by Dr. F. H. Thorp, one of the professors in charge of the chemical engineering course at the Massachusetts Institute of Technology, seventeen or eighteen M. I. T. students visited the plant of the Goodyear Tire and Rubber Company, Akron, O., recently.

Another Plant for Canadian Company—D. Lorne McGibbon, president of the Canadian Consolidated Rubber Company, has announced that the company has decided to enlarge the scope of its business by erecting an additional factory for the exclusive manufacture of automobile tires, the demand for which has become very great in Canada. The president stated that the present plant turned out a certain quantity of tires, but business was so rapidly increasing that a daily output of five hundred tires was necessary and will be provided for when the projected factory is completed. The production will be increased from time to time. Mr. McGibbon said that the new plant would involve an expenditure of a million dollars, as it is the wish of the directors that it be the most up-to-date factory of the kind in the world. The exact location, Mr. McGibbon stated, had not yet been decided upon, but the company will decide this matter in the near future.

Showing the immense new plant of the Pennsylvania Rubber Company at Jeanette, Pa., with a

Another Factory for Sandusky—General contractor Alfred Schnurr, Sandusky, O., will erect a plant for the Suspension Roller Company in the near future.

Adding to Plant Facilities—The Hayes-Ionia Company, Ionia, Mich., has closed a contract with Theophil F. Banhagel for the construction of four kilns and a machine room addition to its factory.

New Searchlight Plant—The Searchlight Company has bought property at 2416 Fourth street, S. E., Minneapolis, Minn., for a branch factory. It will erect a one-story building of brick and concrete to cost $3,000.

Baker Builds Canadian Factory—The Baker Motor Vehicle Company, Cleveland, O., has incorporated in Canada under the name of Baker Motor Vehicle Company, Ltd., of Canada, A factory will soon be erected in Toronto, Ont.

Truck Plant in Toledo Building—Operations have been started in Toledo, O., to erect a three-story factory building, 75 by 125 feet, for the Shop of Siebert, originally wagon and carriage builders, but now manufacturers of a motor truck.

Iowa Ford Assembling Plant—Work began this week on a $70,000 five-story brick building to be used as the home of the C. L. Hering Motor Company, Des Moines, Ia. On the completion of the building all Ford cars sold in Iowa will be assembled here.

New Michigan Truck—The Wenonah Motor Car Company, Bay City, Mich., has entered the field with a light truck. The designing and manufacturing have been in charge of G. Earl Porter, formerly with the Detroit Motor Wagon. Bay City business men are backing the project.

Ford Plant for Frisco—A $300,000 automobile assembling plant for San Francisco in the immediate future was the interesting announcement from the Ford Motor Company at Detroit recently. The plant will be capable of handling 5000 cars during a season and will employ 300 skilled workmen.

Ford Buys in Canada—The Ford Motor Company has bought a large tract of river front property in Walkerville, Ont., adjoining the site of the firm's present Canadian plant, and announces its intention of erecting a large addition to its factory. When completed, the Ford plant will give work to 2,000 men.

To Enlarge Kentucky Plant—H. B. Hewitt, of the electric vehicle department of the Kentucky Wagon Works, Louisville, has established an agency in Chicago. He says the electric vehicle department of the Kentucky plant will gradually be enlarged until it becomes probably the most important branch of the business.

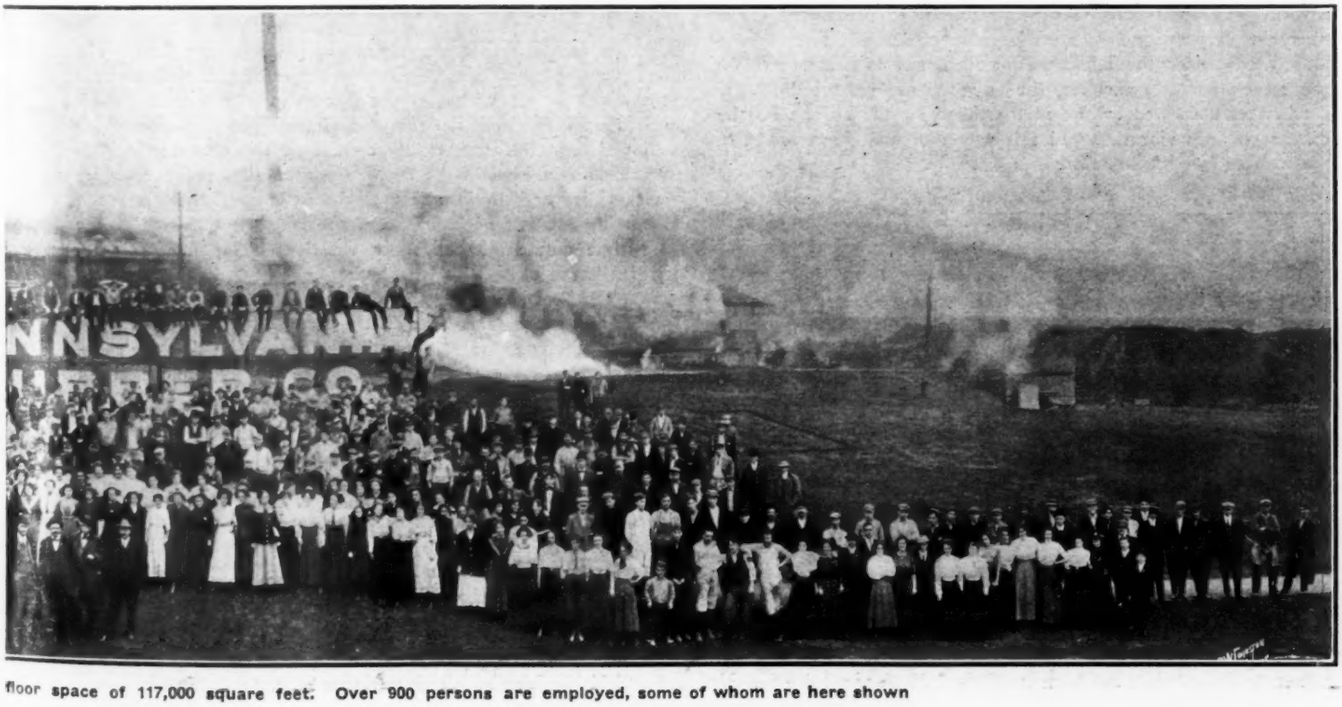
Kenton Adds Repair Department—The Kenton Gas Engine Company, of Kenton, O., has added an automobile repair department to its plant. The company will also handle a full line of motor car accessories as well as the Kenton agency for the Knight tires. T. A. Taylor is general manager of the concern.

Avoiding Canadian Duty—American automobile manufacturers get by the heavy duty on motor cars in Canada by shipping the parts across the border and assembling the car on Canadian soil. The Canadian duty on American-made automobiles completely assembled is about 35 per cent., while the duty on parts imported is about one-half that sum.

To Enter Automobile Business—The firm of John Immel & Sons, Columbus, O., has taken the first step towards entering the automobile business. The concern has completed the erection of a large plant where all kinds of automobile repairing is now being done in addition to body painting. J. E. Jolly, formerly connected with the Packard factory, is foreman of the department.

Lima May Have Tire Plant—E. Jefferson, Pittsburgh, Pa., visited Lima, O., recently with a proposition to establish a $500,000 tire manufacturing plant in that city in case the local people offer the proper inducement. It is announced that the promoters will furnish 52 per cent. of the proposed capital of $500,000 if Lima people subscribe the remainder. It is proposed to give employment to 275 men.

To Make Automobile Axles—A company capitalized at $175,000 has been organized at Kalamazoo, Mich., to manufacture automobile axles. A site for a plant has been purchased and work will be begun soon. O. K. Burkhart and M. H. Lane of Kalamazoo, and Fred Lee of Dowagiac are interested. M. H. Clary of Buchanan, manager of an automobile axle plant there, will take charge of the Kalamazoo plant. The factory at Buchanan will continue to manufacture buggy axles, and this part of the business will be enlarged. The auto axle manufacturing department probably will be brought here.



floor space of 117,000 square feet. Over 900 persons are employed, some of whom are here shown

Can-Holding Bracket; Electric Tail-Light; Baby Klaxon Coming Out; Unique Motion Writer; Electric Hand Drill; Priming Cup and Spark-Plug; Dashboard Switch for Electric Lighting Systems

Oilzum Can Holder Brackets

ECONOMIC arrangement of baggage on a touring car is a problem which puzzles many automobilists. As a consequence, running-boards are frequently packed in a most uncomfortable manner. To reduce this nuisance as far as possible the White & Bagley Company, 100 Foster street, Worcester, Mass., have designed oil-can brackets, Fig. 1, which have the purpose of holding the oil-cans to the running-board at a suitable point of the same. Each bracket is a bronze T, the leg of which is bent to fit under the running-board. The bent portion has two holes, through which screws are passed for fastening the bracket to the board. The upper portion of the leg has a bored extension through which is laid a strap which serves to secure the oil-can to the running-board.

Edelmann Electric Reer-Lite

E. Edelmann & Company, Chicago, Ill., are the manufacturers of an electric lamp which serves to illuminate the rear number plate, while some of its light passes through a red jewel. The lamp is stationed in a box to which a frame is attached, which is capable of holding a license plate of any size. The whole arrangement is secured to the number plate bracket.

New Smaller Klaxon Signal

A new horn, unchristened as yet, is being brought out by the Lovell-McConnell Manufacturing Company, Newark, N. J., maker of Klaxon and Klaxonet signals. The new horn, Fig. 2, closely resembles the Klaxonet in shape and is constructed on the same general principles, the sound being produced by the ratchet teeth rotated by the motor throwing the stirrup on the diaphragm into vibration. In this way the small horn produces the well-known Klaxon signal.

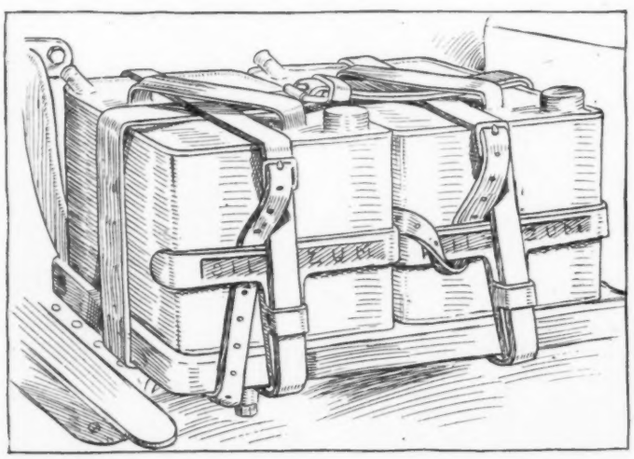


Fig. 1—Oilzum brackets in place on a running-board with cans strapped thereto

Unique Detective Recorder

The instrument shown in Figs. 5 and 6 is the Unique Recorder, made by the Unique Recorder Company, Hazleton, Pa. Its purpose is to prepare a record for the owner's information, giving the length of time during which a car has been operated each day of the week. At the same time the Unique Detective acts as an 8-day clock which is attached permanently to the

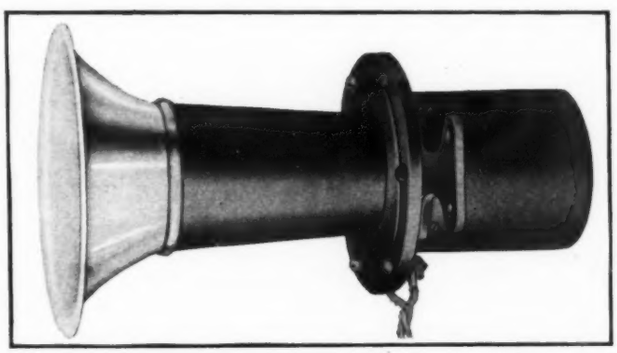


Fig. 2—New unnamed type of Klaxon horn which will be out in September

dash. The appearance of the device is seen in Fig. 5, where it is shown attached to a brass plate in place of the dash. The clock is wound by means of the key at the bottom and set by a stem which is not visible in the illustration. The entire clock mechanism is enclosed in a dust and waterproof casing which is hinged onto the hind casing containing the recorder mechanism, shown in Fig. 6. As this illustration shows, the recorder apparatus is very simple and foolproof. It consists of a pencil Pl steadily raised by the action of the clockwork, which at the same time rotates the recorder sheet which is marked with twice 12 hours once in 24 hours, the point of the pencil bearing against the surface of the sheet. The gear G makes one revolution a day. It is in mesh with the gear Gl, the shaft of which carries another gear meshing with the rack R, so that the rotation of the gear Gl lifts the rack which carries the pencil Pl. The gear Gl rotates on a fork, the end F of which is pivoted on an extension of the stationary post which guides the rack R, while the end Fl is drawn upward by the spring S, which thereby holds it in engagement with the Gear G. To prevent the gear Gl being turned back by the weight of the rack, the pawl P is provided. After one week, when the pencil has traveled from its lowest to its highest position, the owner opens the recorder casing by means of a cam key seen on the right-hand side of the device and disengages the pawl, so that the rack returns to its lowest position. Needless to say, the resultant between the rotary movement of the sheet and the radial one of the pencil is a spiral as shown in Fig. 4. Now the process by means of which periods of rest and motion are distinguished on the re-

cording sheet is as follows: The pendulum P moves whenever the car is in motion, and its movement results in a series of oscillations on the record which appear in the form of heavy lines. The manner in which these oscillations coincide with the spiral-bow sections indicates the time at which the car was running.

Buckeye Electric Breast Drill

The American Foundry Company, Leipsic, O., manufactures the Buckeye electric breast drill. This portable tool is made in a convenient size and shape and may be operated by means of either direct or alternating current. On the drill is mounted a switch which may be moved to neutral or to either side to make the drill rotate in either direction or keep it at rest. The drill spindle sleeve is fitted with a breakover movement which permits of bringing the spindle into a locking position in which it is held from turning by jaws fixed to the drill frame.

Champion Starter Spark-Plug

A combined priming cup and spark-plug has been brought out by the Champion Spark-Plug Company, Toledo, O. This plug has part of its shell bored in an annular chamber open at the bottom of the plug. Into this chamber opens a priming tube which is attached to the side of the shell and consists of a priming hole, a passageway leading therefrom to the annular bore of the shell and a needle valve which may be closed so as to shut off the interior of the annular bore against the outside. Gasoline may be introduced by unseating the needle and squirting in the fuel by means of an oil-can, after which the needle is tightened again on its seat.

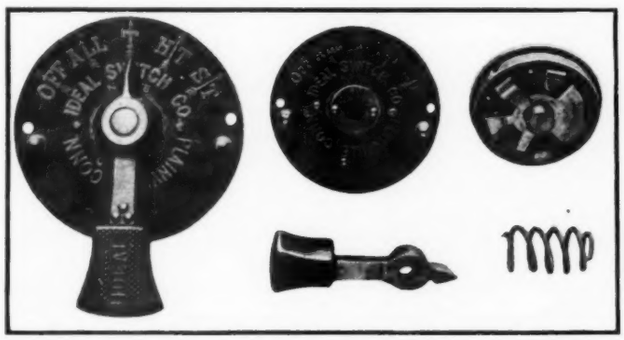


Fig. 3—Ideal lighting dashboard switch and component parts of same

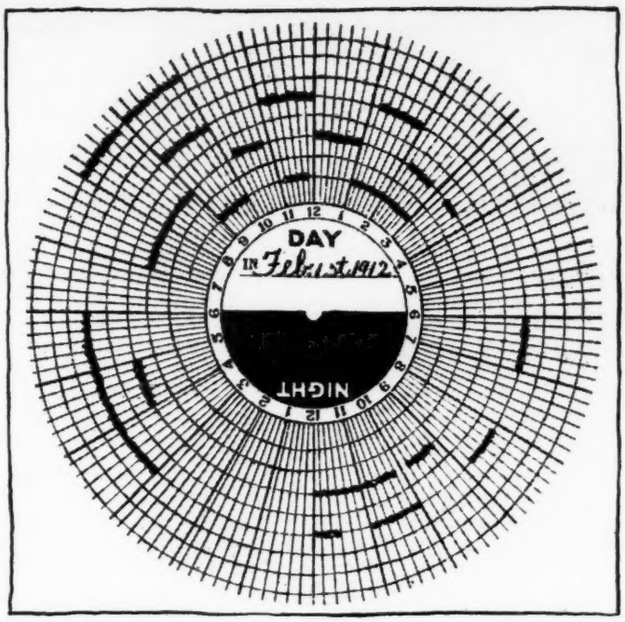


Fig. 4—Record chart for one week, made by the Unique Detective Recorder

Ideal Lighting Dash Switch

One of the latest types of switches is shown in Fig. 3, this being the product of the Ideal Switch Company, Inc., Plainville, Conn. The model shown here is attached to the dashboard, which is bored with four holes for the wires leading from dynamo or battery to the head, side and tail lights and back to the source of current, according to whether it is desired to shut off the light, use any one set, two or three sets of lamps. Seven possible positions of the contact maker have been provided and are marked on the dial or face of the switch. The outside of the switch casing is etched, as shown in Fig. 3, and the hard-rubber handle is designed in a pleasing shape. The view of the inside of the switch shows its simple construction. The leads from the current course to the three sets of lights are connected to the three bent contact pieces, while the return wire is connected to the rotary contact piece.

The spring illustrated serves to space the rotary contact piece from the switch base carrying the other three contact pieces.

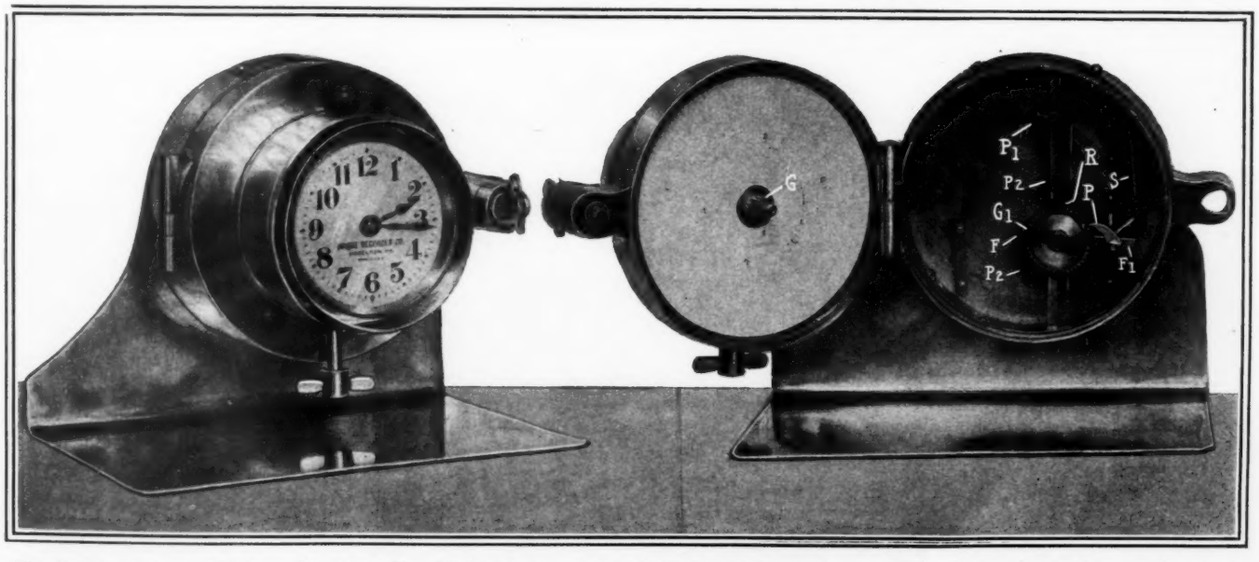


Fig. 5—Front view of Unique recorder. Fig. 6—Mechanism of the Unique motion recorder, comprising gears and rack actuating chart and pencil, and spring insuring engagement

NUMBER Plate Arrangement—In which number plate and tail light are arranged at the two sides of the rear end of the car.

This patent refers to the use of guards at the sides of the automobile body, Fig. 1. These guards gave rearward extensions E and E1, and a license plate L is mounted on the extension E, while a lamp L1 is on the extension E1. The plane of the number plate is mounted at a slight angle to the transverse axis of the vehicle, so that the numbers appearing on the plate may be plainly read from behind the car, while the light radiated by the tail lamp L1 strikes the face of the plate and illuminates it. The tail lamp may be fitted with a lens which concentrates part of its light rays upon the number plate.

No. 1,029,063—to Russell Huff, assignor to Packard Motor Car Company, Detroit, Mich. Granted June 11, 1912; filed October 28, 1910.

Valveless Motor—In which a bored piston and a rotary valve serve to regulate the flow of fresh and dead gases.

Fig. 2 illustrates the four-cycle motor described in this patent, consisting of a cylinder C which is provided with orifices O and O1. These orifices are capable of communicating with the exterior, either for the purpose of admitting fresh gases into the combustion chamber or of scavenging burned gases. In the cylinder reciprocates a rotary piston P which has channels for establishing communication between the interior of the cylinder and the orifices mentioned. A rotary distributer R is provided, which is adapted to admit gas into the cylinder through one of the piston channels and one of the orifices. A prolongation P1 of the piston has a groove G, in which rides a finger E, controlled by the rotary distributer so as to rotate the piston. The relation between piston and distributer is such that the piston, during compression and explosion strokes, covers the orifice leading to the distributer, while at the same time the latter interrupts the current of mixture from the carbureter to the cylinder, all communication between these two parts being cut off during the two strokes named.

No. 1,029,192—to Charles Edouard Henriod, assignor to Société Ribeyrolles & Cie., Puteaux, Seine, France. Granted June 11, 1912; filed November 23, 1909.

Axle-Drive Mechanism—Being of the worm-and-gear type with a thrust-taking member interposed between worm and axle proper.

This construction, Fig. 3, has a stationary axle A on which wheels are journaled and which is connected by a double chain drive to a differential shaft D. A worm gear is provided on the differential shaft, being engaged by a worm W which is carried on the motor shaft S, the latter being in thrust line with the axle. A thrust member T is interposed between the shaft S and the front side of the axle so that all thrust is absorbed between axle and shaft D.

No. 1,029,736—to James H. App, Detroit, Mich. Granted June 18, 1912; filed July 5, 1911.

Method of Cooling Motor—Which consists in casting the inactive face of the engine pistons with radiating studs for air cooling.

This patent refers to a two-cycle engine construction which includes a cylinder, cylinder head and crankcase. A hollow piston is closed at its upper end; it has a smooth working face, while the inactive face of the closed end is cast with heat-radiating studs. Diametrically disposed within the piston is a wristpin which is engaged by the pounded head of a connecting-rod. A deflector plate extends from a portion of the wall of the piston close to the connecting-rod head, and the deflector and head cooperate in deflecting the gases toward one side portion of the piston where an outlet is provided for the gases traveling to the combustion chamber.

No. 1,028,359—to Chester Charles Jones, Beatrice, Neb. Granted June 4, 1912; filed March 5, 1909.

Tire—In which two coiled springs, one arranged within the coils of the other, take the place of inflated inner tubes in the casing.

This patent refers to a tire construction comprising two coiled springs, one of which is situated within the other. On the outer spring a shoe is arranged. This spring carries pins which engage the shoe thereby holding spring and shoe in fixed relation.

No. 1,030,263—to Stephen A. Matarazzo, Wilmerding, Pa. Granted June 18, 1912; filed September 18, 1911.

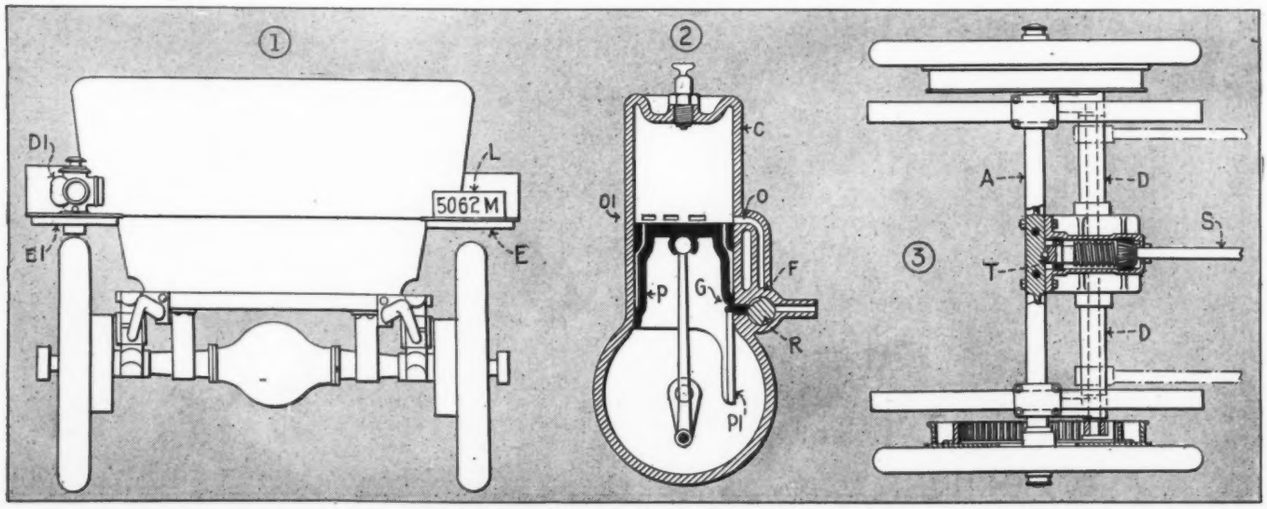


Fig. 1—Huff number plate scheme. Fig. 2—Henriod valveless motor. Fig. 3—Axle-drive mechanism